

VITA

Robert W. Erickson

Education

B.S. (1978), M.S. (1980), Ph.D. (1982) in Electrical Engineering,
California Institute of Technology, Pasadena, California.

Graduate Research Area: Power Electronics

Thesis Title: "Large Signals in Switching Converters

Part I: Distortion in Switching Amplifiers

Part II: Transients in Switching Regulators"

Experience

Nov. 1982 - Present

Assistant Professor (1982), Associate Professor (1989), Professor (1998), ECE
Department Chair (2002-2006), Caroline and Wilfred Slade Professor (2006-),
Department of Electrical and Computer Engineering, University of Colorado, Boulder.
Director, Colorado Power Electronics Center (1999 -).

1979 - 1982

Graduate Research Assistant, California Institute of Technology, Pasadena, CA
(Power Electronics).

1978 (Summer)

Engineer, PerSci, Los Angeles, CA.
Developed microprocessor-controlled head positioning servo
for computer flexible disc drive.

1976 (Summer)

Jr. Engineer, PerSci, Los Angeles, CA.

Book

R. W. Erickson, *Fundamentals of Power Electronics*, (First edition) New York: Chapman
& Hall, May 1997, 791 pages.

R. W. Erickson and D. Maksimovic, *Fundamentals of Power Electronics*, (Second
edition) Kluwer Academic Publishers, December 2000, 910 pages, now in eighth
printing.

Publications: in Transactions with Peer Review

J. Chen, D. Maksimovic, and R. W. Erickson, "Analysis and Design of a Low-Stress Buck-Boost Converter in Universal-Input PFC Applications," *IEEE Transactions on Power Electronics*, vol. 21, no. 2, pp. 320-329, March 2006.

A. Prodic, D. Maksimović, R. W. Erickson, "Dead-zone digital controllers for improved dynamic response of low harmonic rectifiers," *IEEE Transactions on Power Electronics*, vol. 21, no. 1, pp. 173-182, January 2006.

P. Athalye, D. Maksimovic, and R. Erickson, "Variable-Frequency Predictive Digital Current Mode Control," *IEEE Power Electronics Letters*, vol. 2, no. 4, pp. 113-116, December 2004.

Y. Zhang, R. Zane, A. Prodic, R. Erickson, and D. Maksimovic, "Online Calibration of MOSFET On-State Resistance For Precise Current Sensing," *IEEE Power Electronics Letters*, vol. 2, no. 3, pp. 100-103, September 2004

Y. Yin, R. Zane, J. Glaser, and R. Erickson, "Small-Signal Analysis of Frequency-Controlled Electronic Ballasts," *IEEE Transactions on Circuits and Systems, I: Fundamental Theory and Applications*, special issue on switching and systems, vol. 50, no. 8, pp. 1103 – 1110, August 2003.

P. Athalye, D. Maksimovic, and R. Erickson, "High-Performance Front-End Converter for Avionics Applications," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 39, no. 2, pp. 462-470, April 2003.

A. Prodic, J. Chen, D. Maksimovic, and R. Erickson, "Self-Tuning Digitally Controlled Low-Harmonic Rectifier Having Fast Dynamic Response," *IEEE Transactions on Power Electronics*, special issue on digital control in power electronics circuits and drives, pp. 420-428, January 2003.

J. Chen, A. Prodic, R. Erickson, and D. Maksimovic, "Predictive Digital Current Programmed Control," *IEEE Transactions on Power Electronics*, special issue on digital control in power electronics circuits and drives, pp. 429-437, January 2003.

D. Maksimovic, R. Erickson, and C. Griesbach, "Modeling of Cross-Regulation in Converters Containing Coupled Inductors," *IEEE Transactions on Power Electronics*, vol. 15, no. 4, pp. 607-615, July 2000.

M. Madigan, R. Erickson, and E. Ismail, "Integrated High-Quality Rectifier-Regulators," *IEEE Transactions on Industrial Electronics*, vol. 46, no. 4, pp. 749-758, August 1999.

R. Erickson, "Dc-Dc Power Converters," article in *Wiley Encyclopedia of Electrical and Electronics Engineering*, vol. 5, pp. 53-63, 1999.

E. Ismail, C. Oliveira, and R. Erickson, "A Low-Distortion Three-Phase Multiresonant Boost Rectifier with Zero-Current Switching," *IEEE Transactions on Power Electronics*, vol. 13, no. 4, pp. 718-726, July 1998.

Y. Jang and Robert W. Erickson, "New Single-Switch Three-Phase High Power Factor Rectifiers Using Multi-Resonant Zero Current Switching," *IEEE Transactions on Power Electronics*, vol. 13, no. 1, pp. 194-201, Jan. 1998.

Esam Ismail and Robert Erickson, "A New Class of Low Cost Three-Phase High Quality Rectifiers with Zero Voltage Switching," *IEEE Transactions on Power Electronics*, vol. 12, no. 4, pp. 734-742, July 1997.

D. Maksimovic, Y. Jang, and R. Erickson, "Nonlinear-Carrier Control for High Power Factor Boost Rectifiers," *IEEE Transactions on Power Electronics*, Vol. 11, No. 4, July 1996, pp. 578-584.

E. Ismail and R. Erickson, "Single-Switch 3 ϕ PWM Low Harmonic Rectifiers," *IEEE Transactions on Power Electronics*, Vol. 11, No. 2, March 1996, pp. 338-346.

R. Erickson and D. Maksimovic, "High Efficiency DC-DC Converters for Battery-Operated Systems with Energy Management," *Worldwide Wireless Communications, Annual Reviews on Telecommunications*, 1995.

I. A. Khan and R. W. Erickson, "Low-Harmonic Three-Phase Inverters with Nonpulsating Terminal Currents," *IEEE Transactions on Aerospace and Electronics Systems*, vol. 31, no. 2, pp. 634-646, April 1995.

J. Hong, D. Maksimovic, R.W. Erickson, and I. Khan, "Half-Cycle Control of the Parallel Resonant Converter Operated as a High Power Factor Rectifier", *IEEE Transactions on Power Electronics*, vol. 10, no. 1, pp. 1-8, January 1995.

Iftikhar Khan and Robert Erickson, "Synthesis and Analysis of Harmonic-Free Three-Phase Inverters," *IEEE Transactions on Power Electronics*, vol. 9, no. 6, pp. 567-579, Nov. 1994.

S. Singer and R.W. Erickson, "Power-Source Element and Its Properties," *IEE Proceedings - Circuits Devices and Systems*, vol. 141, no. 3, pp. 220-226, June 1994.

S. Singer and R. Erickson, "Canonical Modeling of Power Processing Circuits Based on the POPI Concept," *IEEE Transactions on Power Electronics*, vol. 7, no. 1, January 1992.

Yungtaek Jang and Robert Erickson, "Physical Origins of Input Filter Oscillations in Current Programmed Converters," *IEEE Transactions on Power Electronics*, vol 7, no. 4, pp. 725-733, October 1992.

Arthur Witulski, Adan Hernandez, and Robert Erickson, "Small-Signal Equivalent Circuit Modeling of Resonant Converters," *IEEE Transactions on Power Electronics*, January 1991.

Stephen W. Anderson, Robert W. Erickson, and Ronald A. Martin, "An Improved Automotive Power Distribution System Using Nonlinear Resonant Switch Converters," *IEEE Transactions on Power Electronics*, January 1991.

Robert Erickson, Adan Hernandez, Arthur Witulski, and Renjie Xu, "A Nonlinear Resonant Switch," *IEEE Transactions on Power Electronics*, vol. 4, no. 2, pp. 242-252, April 1989.

Arthur Witulski and Robert Erickson, "Extension of State-Space Averaging to Resonant Switches— and Beyond," *IEEE Transactions on Power Electronics*, vol. 5, no. 1, pp. 98-109, January 1990.

S. D. Johnson, A. F. Witulski, and R. W. Erickson, "A Comparison of Resonant Topologies in High Voltage Applications," *IEEE Transactions on Aerospace and Electronic Systems*, Vol. AES-24, No. 3, pp. 263-274, July 1988.

Art Witulski and Robert Erickson, "Design of the Series Resonant Converter for Minimum Component Stress," *IEEE Transactions on Aerospace and Electronic Systems*, vol. AES-22, no. 4, pp. 356-363, July 1986.

S. Johnson and R. W. Erickson, "Steady-State Analysis and Design of the Parallel Resonant Converter," *IEEE Transactions on Power Electronics*, Vol. 3, No. 4, pp. 93-104, Jan. 1988.

Art Witulski and Robert Erickson, "Steady-State Analysis of the Series Resonant Converter," *IEEE Trans. on Aerospace and Electronic Systems*, Vol. AES-21, No. 6, pp. 791-799, Nov. 1985.

I. Horowitz, M. Sidi, and R. Erickson, "Quantitative Feedback Synthesis for Nonlinear Switched-Mode Uncertain Regulators," *International Journal of Electronics*, Vol. 57, No. 4, pp. 461-476, Oct. 1984.

Publications: Other

Steven G. Trabert and Robert W. Erickson, "Steady-State Analysis of the Duty Cycle Controlled Series Resonant Converter", reprinted in *Recent Advances in Resonant Converters*, K. Sum (ed), Intertec Communications Inc., May 1 1988.

Arthur F. Witulski and Robert W. Erickson, "Small Signal AC Equivalent Circuit Modelling of the Series Resonant Converter," reprinted in *Recent Advances in Resonant Converters*, K. Sum (ed), Intertec Communications Inc., May 1 1988.

Art Witulski and Robert Erickson, "Design of the Series Resonant Converter for Minimum Component Stress," reprinted in *Recent Advances in Resonant Converters*, K. Sum (ed), Intertec Communications Inc., May 1 1988.

Publications: Papers Published in Reviewed Conference Proceedings

S. Angkititrakul and R. Erickson, "Capacitor Voltage Balancing Control for a Modular Matrix Converter," *IEEE Applied Power Electronics Conference*, pp. 1659-1665, March 2006.

D. Maksimović, R. Zane, R. Erickson, "Advances in practical high-performance digital control," invited paper, *Digital Power Forum*, September 2005.

P. Athalye, D. Maksimović, R. Erickson, "Improving efficiency of the active-clamped SEPIC rectifier at high line frequencies," *IEEE Applied Power Electronics Conference and Exposition 2005*, vol. 2, pp. 1152-1157, March 6-10, 2005.

P. Athalye, D. Maksimović, R. Erickson, "DSP implementation of a single-cycle predictive current controller in a boost PFC rectifier," *IEEE Applied Power Electronics Conference and Exposition 2005*, vol. 2, pp. 837-842, March 6-10, 2005.

D. Maksimovic, R. Zane, R. Erickson, "Impact of digital control in power electronics," *IEEE International Symposium on Power Semiconductor Devices & ICs*, invited paper, Kitakyushu, Japan, May 2004.

S. Angkititrakul and R. Erickson, "Control and Implementation of a New Modular Matrix Converter," *IEEE Applied Power Electronics Conference*, February 2004.

L. Petersen and R. Erickson, "Reduction of Voltage Stresses in Buck-Boost Type Power Factor Correctors Operating in Boundary Conduction Mode," *IEEE Applied Power Electronics Conference*, February 2003.

A. Prodic, D. Maksimovic, and R. Erickson, "Digital Controller Chip Set for Isolated DC Power Supplies," *IEEE Applied Power Electronics Conference*, February 2003.

A. Prodic, D. Maksimovic, and R. Erickson, "Dead-Zone Digital Controller for Improved Dynamic Response of Power Factor Preregulators," *IEEE Applied Power Electronics Conference*, February 2003.

A. Prodic, D. Maksimovic, and R. Erickson, "Digitally Controlled Low-Harmonic Rectifier Having Fast Dynamic Responses," *IEEE Applied Power Electronics Conference*, March 2002.

Y. Yan, R. Zane, R. Erickson, and J. Glaser, "Dynamic Analysis of Frequency-Controlled Electronic Ballasts," *IEEE Industry Applications Society Annual Meeting*, October 2002.

J. Chen, D. Maksimovic, and R. Erickson, "A New Low-Stress Buck-Boost Converter for Universal-Input PFC Applications," *IEEE Applied Power Electronics Conference*, February 2001.

K. Changtong, R. Erickson, and D. Maksimovic, "A Comparison of the Ladder and Full-Order Models," *IEEE Power Electronics Specialists Conference*, June 2001.

J. Chen, D. Maksimovic, and R. Erickson, "Buck-Boost PWM Converters Having Two Independently Controlled Switches," *IEEE Power Electronics Specialists Conference*, June 2001.

P. Athalye, D. Maksimovic, and R. Erickson, "High-Performance Front-End Converter for Avionics Applications," *Proc. Power Conversion and Intelligent Motion Conference*, Sept. 2001.

R. Erickson and O. Al Naseem, "A New Family of Matrix Converters," *IEEE Industrial Electronics Society Annual Conference (IECON 01)*, Nov. 2001.

J. Chen, R. Erickson, and D. Maksimovic, "Averaged Switch Modeling of Boundary Conduction Mode DC-to-DC Converters," *Proc. IEEE Industrial Electronics Society Annual Conference (IECON 01)*, Nov. 2001.

A. Prodic, D. Maksimovic, and R. Erickson, "Design and Implementation of a Digital PWM Controller for a High-Frequency Switching DC-to-DC Power Converter," *Proc. IEEE Industrial Electronics Society Annual Conference (IECON 01)*, Nov. 2001.

P. Athalye, D. Maksimovic, and R. Erickson, "Averaged Switch Modeling of Active-Clamped Converters," *Proc. IEEE Industrial Electronics Society Annual Conference (IECON 01)*, Nov. 2001.

O. Al-Naseem and R. Erickson, "Prediction of Switching Loss Variations by Averaged Switch Modeling," *IEEE Applied Power Electronics Conference*, February 2000.

R. Erickson, "Optimal Single-Resistor Damping of Input Filters," *IEEE Applied Power Electronics Conference*, March 1999.

D. Maksimovic and R. Erickson, "Modeling of Cross Regulation in Multiple-Output Flyback Converters," *IEEE Applied Power Electronics Conference*, March 1999.

R. Erickson and D. Maksimovic, "A Multiple-Winding Magnetics Model Having Directly Measurable Parameters," *IEEE Power Electronics Specialists Conference*, May 1998.

D. Maksimovic, R. Erickson, and C. Griesbach, "Modeling of Cross-Regulation in Converters Containing Coupled Inductors," *IEEE Applied Power Electronics Conference*, pp. 350-356, Feb. 1998.

Robert W. Erickson, "Advances in Averaged Switch Modeling," SOBRAEP/IEEE Fourth Brazilian Power Electronics Conference, December 1997, invited paper and tutorial seminar.

R. W. Erickson, "Some Topologies of High Quality Rectifiers," *IEEE Conference on Energy, Power, and Motion Control*, May 5-6 1997, Tel-Aviv Israel, invited keynote paper.

Y. Jang and R. Erickson, "Design and Experimental Results of a 6kW Single-Switch Three-Phase High Power Factor Rectifier Using Multi-Resonant Zero Current Switching," *IEEE Applied Power Electronics Conference*, 1996 Record, pp. 524-530.

D. Maksimovic, Y. Jang, and R. Erickson, "Nonlinear-Carrier Control for High Power Factor Boost Rectifiers," *IEEE Applied Power Electronics Conference*, 1995 Record, pp. 635-641.

D. Maksimovic and R. Erickson, "Universal-Input High-Power-Factor Boost Doubler Rectifiers," *IEEE Applied Power Electronics Conference*, 1995 Record, pp. 459-465.

E. Ismail, C. Oliveira, and R. Erickson, "A Low Distortion Three-Phase Multi-Resonant Boost Rectifier with Zero Current Switching," *IEEE Applied Power Electronics Conference*, 1995 Record, March 1995, pp. 849-855.

B. Arbetter, R. Erickson, and D. Maksimovic, "DC-DC Converter Design for Battery-Operated Systems," *IEEE Power Electronics Specialists Conference*, 1995 Record, June 1995, pp. 103-109.

E. Ismail and R. Erickson, "Application of One-Cycle Control to Three-Phase High Quality Resonant Rectifier," *IEEE Power Electronics Specialists Conference*, 1995 Record, June 1995.

Y. Jang and Robert W. Erickson, "New Single-Switch Three-Phase High Power Factor Rectifiers Using Multi-Resonant Zero Current Switching," *IEEE Applied Power Electronics Conference*, 1994 Record, pp. 711-717, March 1994.

M.A. Johnston and R.W. Erickson, "Reduction of Voltage Stress in the Full Bridge BIBRED by Duty Ratio and Phase Shift Control," *IEEE Applied Power Electronics Conference*, 1994 Record, March 1994.

Jiatian Hong, Dragan Maksimovic, Robert Erickson, and Iftikhar Khan, "Half-Cycle Control of the Parallel Resonant Converter Operated as a High Power Factor Rectifier," *IEEE Applied Power Electronics Conference*, 1994 Record, March 1994.

Yungtaek Jang and Robert Erickson, "New Quasi- and Multi-Resonant Integrated Magnetic Zero Voltage Switching Converters," *IEEE Power Electronics Specialists Conference*, 1993 Record, June 1993.

Jiatian Hong, Esam Ismail, Robert Erickson, and Iftikhar Khan, "Design of the Parallel Resonant Converter as a Low Harmonic Rectifier," *IEEE Applied Power Electronics Conference*, 1993 Record, March 1993.

Esam Ismail and Robert Erickson, "A New Class of Low Cost Three-Phase High Quality Rectifiers with Zero Voltage Switching," *IEEE Applied Power Electronics Conference*, 1993 Record, March 1993.

E. F. Fuchs, A. A. Fardoun, P. W. Carlin, and R. W. Erickson, "Permanent-Magnet Machines for Operation with Large Speed Variations," *Proceedings of Windpower 1992*, October 1992.

Esam Ismail and Robert W. Erickson, "A Single Transistor Three Phase Resonant Switch for High Quality Rectification," *IEEE Power Electronics Specialists Conference*, 1992 Record, pp. 1341-1351, June 1992.

Michael Madigan, Robert Erickson, and Esam Ismail, "Integrated High Quality Rectifier-Regulators," *IEEE Power Electronics Specialists Conference*, 1992 Record, pp. 1043-1051, June 1992.

Yungtaek Jang and Robert Erickson, "Physical Origins of Input Filter Oscillations in Current Programmed Converters," *IEEE Applied Power Electronics Conference*, 1991 Record, March 1991.

A.F. Hernandez, R.W. Erickson, S. Lofton, and P. Anderson, "A Large Signal Computer Model for the Series Resonant Converter," *IEEE Power Electronics Specialists Conference*, 1991 Record, pp. 737-744, June 1991.

P.M. Anderson, S.E. Lofton, R.W. Erickson, A.F. Hernandez, and G.L. Fronista, "Requirements and Design of a 30 kW Dc-Dc Converter for Space-Based Radar Applications," *26th Intersociety Energy Conversion Engineering Conference*, vol. 2, pp. 184-189, 1991.

Robert Erickson, Michael Madigan, and Sigmund Singer, "Design of a Simple High Power Factor Rectifier Based on the Flyback Converter," *IEEE Applied Power Electronics Conference*, 1990 Record, pp. 792-801, March 1990.

Stephen W. Anderson, Robert W. Erickson, and Ronald A. Martin, "An Improved Automotive Power Distribution System Using Nonlinear Resonant Switch Converters," *IEEE/SAE Workshop on Automotive Power Electronics*, August 1989.

Robert Erickson, Adan Hernandez, Arthur Witulski, and Renjie Xu, "A Nonlinear Resonant Switch," *IEEE Power Electronics Specialists Conference*, 1989 Record, pp. 43-50, June 1989.

Arthur Witulski and Robert Erickson, "Extension of State-Space Averaging to Resonant Switches— and Beyond," *IEEE Power Electronics Specialists Conference*, 1989 Record, pp. 476-483, June 1989.

Steven G. Trabert and Robert W. Erickson, "Steady-State Analysis of the Duty Cycle Controlled Series Resonant Converter", *IEEE Power Electronics Specialists Conference*, 1987 Record, pp. 545-556.

Arthur F. Witulski and Robert W. Erickson, "Small Signal AC Equivalent Circuit Modelling of the Series Resonant Converter," *IEEE Power Electronics Specialists Conference*, 1987 Record, pp. 693-704.

S. D. Johnson, A. F. Witulski, and R. W. Erickson, "A Comparison of Resonant Topologies in High Voltage Applications," *IEEE Applied Power Electronics Conference*, 1987 Proceedings, pp. 145-156.

I. Khan and R. W. Erickson, "Control of Switched-Mode Converter Harmonic-Free Terminal Waveforms through Internal Energy Storage," *IEEE Power Electronics Specialists Conference*, 1986 Record, pp. 13-26, June 1986.

S. Johnson and R. W. Erickson, "Steady-State Analysis and Design of the Parallel Resonant Converter," *IEEE Power Electronics Specialists Conference*, 1986 Record, pp. 154-165, June 1986

Robert Erickson, "Synthesis of Switched-Mode Converters," *IEEE Power Electronics Specialists Conference*, 1983 Record, pp. 9-22.

Robert Erickson, Slobodan Cuk, and R. D. Middlebrook, "Large Signal Analysis and Design of Switching Regulators," *IEEE Power Electronics Specialists Conference*, 1982 Record, pp. 240-250.

Robert Erickson and R. D. Middlebrook, "Origins of Harmonic Distortion in Switching Amplifiers," *Proceedings Fourth Annual International PCI '82 Conference*, pp. 567-582, March 1982.

Robert Erickson, Bill Behn, R. D. Middlebrook, and Slobodan Cuk, "Characterization of Power MOSFET's in Switching Converters," *Proceedings Seventh National Solid-State Power Conversion Conference (Powercon 7)*, pp. D4.1-D4.17, March 1980.

Slobodan Cuk and Robert Erickson, "A Conceptually New High-Frequency Switched-Mode Amplifier Technique Eliminates Current Ripple," *Proceedings Fifth National Solid-State Power Conversion Conference (Powercon 5)*, pp. G3.1-G3.22, May 1978.

Conference Tutorial Seminars and Other Presentations

R Erickson, "Directions in Power Conditioning," NREL NWTC Drivetrain Workshop, invited presentation, 10/1/04.

R. Erickson, "Future Directions in Wind Power Conversion Electronics," Stanford Global Climate and Energy Project, Wind power workshop, invited presentation, April 26, 2004.

R. Erickson, D. Maksimovic, and R. Zane, "Advancing Digital Control of Switched-Mode Converters," special presentation session on current topics in power electronics research, *IEEE Applied Power Electronics Conference*, February 2004.

Robert Erickson and Dragan Maksimovic, "A Primer on Simulation, Modeling, and Design of the Control Loops of Switching Regulators," tutorial seminar presented at *IEEE Applied Power Electronics Conference*, February 2003.

Robert Erickson, "Variable-Speed Wind Generation and Related Power Electronics," IEEE joint PES/IAS Denver chapter meeting, 5/20/99.

Robert Erickson and Dragan Maksimovic, "Cross-Regulation Mechanisms in Multiple-Output Forward and Flyback Converters," tutorial seminar presented at *IEEE Applied Power Electronics Conference*, March 1999.

Dragan Maksimovic and Robert Erickson, "Advances in Averaged Switch Modeling and Simulation," tutorial seminar presented at *IEEE Power Electronics Specialists Conference*, June 1999.

Robert Erickson, "Tutorial Seminars on Machines, Power Semiconductors, and Converters," National Wind Technology Center, NREL, Rocky Flats CO, August 1995.

Robert Erickson, "High Efficiency DC-DC Converters for Battery-Operated Systems", invited seminar at Fluke Engineering Conference, May 4, 1994.

Robert Erickson, Renjie Xu, and Adan Hernandez, "Magnetics in Nonlinear Resonant Switch Converters," tutorial session at High Frequency Power Conversion Conference, May 1989, Naples Florida. Reprinted in *Power Conversion and Intelligent Motion*, Intertec Communications, vol. 15, no. 9, pp.112-114, Sept. 1989.

Robert Erickson, "The Nonlinear Resonant Switch in Automotive Applications," GM Power Conversion Summit Meeting, GM Research Labs, Warren MI, September 1989.

Awards and Recognition

Fellow of the IEEE

Received IEEE Power Electronics Society Transactions Prize Paper Award for 1996, for the paper "Nonlinear Carrier Control for High-Power-Factor Boost Rectifier," published in *IEEE Transactions on Power Electronics*, vol. 11, no. 4, July 1996.

Received Best Presentation award for IECON paper, "Design and Implementation of a Digital PWM Controller for a High-Frequency Switching DC-to-DC Power Converter," *Proc. IEEE Industrial Electronics Society Annual Conference (IECON 01)*, Nov. 2001.

Received Best Presentation award for IECON paper, "A New Family of Matrix Converters," *IEEE Industrial Electronics Society Annual Conference (IECON 01)*, Nov. 2001.

Received Best Use of Graphics Award and Best Session Award for Powercon 7 paper, "Characterization and Implementation of Power MOSFET's in Switching Converters," March 1980.

Received Best Session Award for Powercon 5 paper, "A Conceptually New High Frequency Switched-Mode Amplifier Eliminates Current Ripple," May 1978.

Member, Eta Kappa Nu.

Research Support

"A New Family of Multilevel Matrix Converters for Wind Power Applications," National Renewable Energy Laboratory (DOE), 10/1/02 – 2/28/06, Principal Investigator.

"A Novel Power Electronics System for Wind Generation Applications," National Renewable Energy Laboratory (DOE), 9/1/99-8/31/02, Principal Investigator.

"Wind Generation Inverters Having High Efficiency at All Power Levels," National Renewable Energy Laboratory (DOE), 10/1/97-12/31/98, Principal Investigator.

"Analysis of Spacecraft Electrical Power Converters," Analog Systems subcontract to Lockheed-Martin Corp., 4/1/97 - 9/12/97, Principal Investigator.

"Electric Vehicle Single-Phase Battery Chargers," GM Corp., 10/1/93-12/31/94, Principal Investigator.

"Electrosurgical Generator Technology Assessment," Valleylab, Inc., 6/1/92–10/31/92, Principal Investigator.

"Electric Vehicle Single-Phase Battery Chargers," GM Corp., 1/1/92-7/31/93, Principal Investigator.

“Support of Power Electronics Program,” StorageTek Corp., 4/13/92 - 4/12/93, CU Foundation grant, Principal Investigator.

“Bidirectional Power Conversion for Advanced Spacecraft Power Systems,” Martin-Marietta Corp., 3/1/91-6/15/91, Principal Investigator.

“Space Power Conditioning Systems for 5-100kW Baseload Power Program,” Martin-Marietta Corp., 4/15/90-12/21/90, Principal Investigator.

“Development of Power Electronics Program,” General Electric Foundation, 7/1/87 - 6/30/90, Principal Investigator.

“Advanced Automotive Electronic Power Conditioning Systems,” GM Delco-Remy, 4/1/86- 12/21/89, Principal Investigator.

“Modeling and Design of Three-Phase AC Line Filters for Switched-Mode Regulators,” IBM Corp., 3/25/86 - 12/31/87, Principal Investigator.

“Initiation of Power Electronics Program,” General Electric Foundation, 5/23/83-8/28/86, Principal Investigator.

“Steady-State Analysis and Design of High Voltage Resonant Converters,” IBM Corp., 10/9/84 - 10/8/85, Principal Investigator.

Research Support: projects operated through CoPEC

“Modeling and Analysis of Electronic Ballast Systems,” GE, 1/1/01- 12/31/01

“High-Performance Front-End Power Supply,” Rockwell-Collins, 9/1/99-8/31/02

“Two-Switch Converters for Universal-Input Power Factor Correction,” Philips Research, 9/1/99-8/31/02.

“Drivers for Solid-State Lighting,” Philips Electronics, 1/1/01 – 12/31/01.

Teaching

Courses taught:

ECEN 2260 - Circuits and Electronics 2

ECEN 3170 - Energy Conversion

ECEN 3030 - Electric and Electronic Circuits (nonmajors)

ECEN 4138 - Introduction to Control System Analysis

ECEN 4458 - Process Control Lab

ECEN 4517 - Energy Conversion Lab / Power Electronics Lab

ECEN 5797 - Power Electronics 1

ECEN 5807 - Power Electronics 2

ECEN 5007 - Power Electronics 3
ECEN 5913 - Introduction to Intelligent Machines and Systems

Short Courses:

1. "Modelling and Analysis of Switched-Mode Converters"
2. "Advanced Modelling of Switched-Mode Converters"
(Intensive video short courses offered through the University of Colorado Center for Advanced Training in Engineering and Computer Science)
3. "Resonant Power Conversion," (Short course offered through Gordon Center for Energy Studies, Tel-Aviv University)
4. "High Quality Rectification" (Short course offered through Gordon Center for Energy Studies, Tel-Aviv University)
5. "Converter Modeling and Analysis" (Short course presented to Woodward Governor Company, Ft. Collins CO)

Teaching Enrichment:

Received CU Undergraduate Teaching Enrichment Award for "Development of Portable Video Centers for Laboratory Teaching," March 1987.
Received CU Undergraduate Teaching Enrichment Award for "A Novel Approach to the Student-Machine Interface," Feb. 1988.
Received CU EEF Award for "Integration of Computer-Controlled Renewable-Energy System Design Projects in the ECEN4517/5017 Laboratory," Aug. 2000.

Laboratory Gifts:

Tektronix, \$25,000, digitizing oscilloscope system for power electronics lab, April 2002.
John Fluke Mfg. Corp., \$75,005, computer-controlled instrumentation for undergraduate power and circuits/electronics labs and for graduate power electronics research, January 1990.
Hewlett-Packard, \$32,400, digitizing oscilloscope systems for undergraduate power, process control, and electronics laboratories, July 1988.
Tektronix, \$20,015, digitizing oscilloscopes for undergraduate power and process control laboratories, and graduate power electronics research, 1987.
IBM Corp., est. \$10,000, magnetics fabrication equipment, parts, and supplies for graduate power electronics research, 1987.

Patents

D. Maksimovic, J. Chen, A. Prodic, and R. Erickson, "Predictive Digital Current Controller for Switching Power Controller," U.S. Patent 7,148,669 B2, Dec. 12, 2006.

R. Erickson, O. Alnaseem, and L. Fingersh, "Variable-Speed Wind Power System with Improved Energy Capture via Multilevel Conversion," U.S. Patent 6,900,998 B2, May 31 2005.

R. Erickson and D. Maksimovic, "Universal-Input Rectifiers with High-Power Factor Boost Doublers," U.S. Patent No. 5,383,109, 1995.

R. Erickson, Y. Jang, and D. Maksimovic, "Nonlinear-Carrier Controllers for High Power Factor Rectifiers," U.S. Patent No. 5,867,379, February 2, 1999.

R. W. Erickson, "Nonlinear Resonant Switch and Converter," U.S. Patent No. 4,829,232, May 9, 1989.

R. W. Erickson and I. A. Khan, "DC-to-Three-Phase AC Switched Mode Converter," U.S. Patent No. 4,677,539, June 30, 1987.

R. W. Erickson, Jr. and G. R. Stevens, "Disc Drive System," U.S. Patent No. 4,237,502, Dec. 2, 1980.

R. W. Erickson, Sr. and R. W. Erickson, Jr., "Disc File System with Improved Seek Control," U.S. Patent No. 4,125,882, Nov. 14, 1978.

Professional Activities

Member of Scientific Committee, EPMC'97.

Associate Editor, *IEEE Transactions on Power Electronics*, 1993-94.

Reviewer, *IEEE Transactions on Education*, *IEEE Transactions on Aerospace and Electronic Systems*.

Member of Program Committees of 1989-2001, 2006-2007 IEEE Power Electronics Specialists Conferences

Publicity Chair, 2007 IEEE Power Electronics Specialists Conference

Member of Program Committees of 1999-2005 IEEE Applied Power Electronics Conferences

Member of Program Committee of IEEJ International Power Electronics Conference—Tokyo 2000

Organizer of rap session on resonant power conversion, 1989 IEEE Power Electronics Specialists Conference

Session chairman, "Resonant Converters," 1989 IEEE Power Electronics Specialists Conference

Tutorial session chairman, "High Power Factor Rectifiers," 1990 IEEE Applied Power Electronics Conference

Session chairman, "High Frequency Resonant Converters," 1990 IEEE Power Electronics Specialists Conference

Member of rap session panel, "Is APEC Serving the Needs of Its Constituents and Living Up to Its Name?" 1999 IEEE Applied Power Electronics Conference.

Member of rap session panel, "How Do You Put the Power in a Power Engineer?" 1998 IEEE Applied Power Electronics Conference.

Member of rap session panel, "Trends in Power Electronics," 1990 IEEE IECON

Session chairman, "High Frequency Power Conversion," 1992 IEEE Power Electronics Specialists Conference

Session chairman, "Inverter Control," 1992 IEEE Power Electronics Specialists Conference

Session chairman, "Zero Voltage Switching PWM," 1993 IEEE Power Electronics Specialists Conference.

Session chairman, 2001 IEEE IECON.

Major Internal Service

ECE Department Chair, 2002 – 2006

ECE Executive Committee: member, 1999 – 2002.

College of Engineering First Level Review Committee: member, 1998 – 2000; Chairman, 2000 – 2001.

ECE Curriculum Committee: member, 1997 – 2000; Chairman, 2000 – 2002. As chairman, developed ECE assessment processes and revised degree program objectives for ABET 2000 accreditation. Wrote reports for ABET interim visits of Feb. and Oct. 2001.

Developed Professional Certificate program in Power Electronics, operated through ECE Dept and CATECS, 2001.

Founded and directed the Colorado Power Electronics Center, 1999 – present (with D. Maksimovic).

Graduate Thesis Committees– Serving as Major Advisor (completed)

1. George D. Reyes, "The D³C: A New Converter," M.S. Thesis, 1984.
2. Arthur F. Witulski, "Steady State Analysis and Design of the Series Resonant Converter," M.S. Thesis, 1986.
3. Steven D. Johnson, "Steady State Analysis of the Parallel Resonant Converter," M.S. Thesis, 1986.
4. Eric Kronwall, "An Investigation of a Three-Phase Harmonic-Free Switched-Mode Converter," M.S. Thesis, 1986.
5. Iftikhar A. Khan, "Synthesis and Analysis of Harmonic-Free AC Switched-Mode Converters," Ph.D. Thesis, 1986.
6. Steven G. Trabert, "Steady State Analysis of the Variable Duty Cycle Series Resonant Converter," M.S. Thesis, 1987.
7. Tahar Zebbadji, "Voltage Sharing via Feedback for DC Series Connection of Switched-Mode Converters," M.S. Thesis, 1987.
8. Christos Philippou, "A Computer Package for the Steady-State Analysis of Three-Phase AC Line Filter / Rectifier Systems," M.S. Thesis, 1987.

9. Ming-Ying Zhou, "Steady State Analysis of Three-Phase Line Filters with Embedded Rectifiers," M.S. Thesis, 1988.
10. Adan Hernandez, "Dynamic Analysis of the Parallel Resonant Converter," M.S. Thesis, 1988.
11. Arthur F. Witulski, "Small-Signal Equivalent Circuit Modeling of Resonant Power Converters," Ph.D. Thesis, Dec. 1988.
12. Renjie Xu, "Synthesis and Analysis of Nonlinear Resonant Switched Converters and Linear Resonant Switched Inverters," Ph.D. Thesis, December 1990.
13. Adan F. Hernandez, "Modelling and Analysis of Resonant Converters With Applications to the Design of Aerospace Power Systems," Ph.D. Thesis, July 1991.
14. Yungtaek Jang, "Physical Origins of Input Filter Oscillations in Current-Programmed Converters," M.S. Thesis, December 1991.
15. Michael Madigan, Ph.D Thesis, "Integrated High Quality Rectifier-Regulators", August 1992.
16. Esam Ismail, Ph.D. Thesis, "Three-Phase High Quality Rectification," August 1993.
17. Mark Johnston, M.S. Thesis, "Full Bridge Boost Integrated With Buck Rectifier/Energy Storage/Dc Regulator," August 1993.
18. Luis Golcher, M.S. Thesis, "Theoretical Study of the Three-Phase Buck-Type Zero-Current-Switching Resonant Rectifier," May 1994.
19. Yungtaek Jang, Ph.D. Thesis, "Application of Resonant Technique for Three Phase High Power Factor Rectification and Integrated Magnetic Converters," April 1995.
20. Reza Kazi, M.S. Thesis, "Designing a Highly Efficient Converter which has Wide Use in Telecommunications Products," 1996.
21. Osama Al-Naseem, Ph.D. Thesis, "Modeling and Space-Vector Control of a Novel Multilevel Matrix Converter for a Variable-Speed Wind Power Generator," April 2001.
22. Khaled Al Mazeedi, Ph.D. Thesis, "Modeling and Control of the Currents and Capacitor Voltages of a Novel Multilevel Matrix Converter," December 2005.
23. Sitthipong Angkititrakul, Ph.D. Thesis, "Control and Implementation of a Multilevel Matrix Converter," January 2006.