VITA

Robert W. Erickson

Education

California Institute of Technology	Engineering and Applied Science	B.S., 1978
California Institute of Technology	Electrical Engineering	M.S., 1980
California Institute of Technology	Electrical Engineering	Ph.D., 1983

Graduate Research Area: Power Electronics

Experience

2024-present	**Distinguished Professor** ECEE Department, University of Colorado, Boulder
2018-2020	**Interim Department Chair and Palmer Leadership Chair** ECEE Department, University of Colorado, Boulder
2018-present	**Founder and Chief Technology Officer** BREK Electronics, Inc.
2014-2015	**Interim Department Chair** ECEE Department, University of Colorado, Boulder
2012-2024	**Professor** ECEE Department, University of Colorado, Boulder
2011	**Founder and Chief Technology Officer** Phobos Energy, Inc. (on leave from university)
2006 – 2010	**Caroline and Wilfred Slade Professor** ECE Department, University of Colorado, Boulder
1999 – present	**Director** Colorado Power Electronics Center, University of Colorado, Boulder (co-directs with with D. Maksimovic)
2002 – 2006	**Department Chair** ECE Department, University of Colorado, Boulder
1998 – 2006	**Professor** ECE Department, University of Colorado, Boulder
1989 – 1998	**Associate Professor** ECE Department, University of Colorado, Boulder
1982 – 1989	**Assistant Professor** ECE Department, University of Colorado, Boulder

Awards and Recognition

IEEE William E. Newell Power Electronics Award, 2021. *For contributions to power electronics education and analysis, modeling, and design of power converters.*

Life Fellow of the IEEE

h-index: 64 (Google Scholar)

Received CU-Boulder CEAS Textbook Award for 2021.

Received ECEE Holland Teaching Award for 2007

University of Colorado IT/Physical Sciences Company of the Year—Phobos Energy, 2011.

CU-Boulder Inventor of the Year, 2014

Received ECEE Outstanding Service Award for 2016

Received ECEE Holland Teaching Award for 2017

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 Poster Award for PVSC paper, "Module Mismatch Loss and Recoverable Power in Unshaded PV Installations," *38th IEEE Photovoltaic Specialists Conference* (PVSC), June 2012.

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.

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) Springer Science+Business, December 2000, 910 pages.

R. W. Erickson and D. Maksimovic, *Fundamentals of Power Electronics*, (Third edition) Springer Nature, July 2020, 1104 pages.

MOOC (Massive Open Online Course) Development

Introduction to Power Electronics

Developed free MOOC offered twice via Coursera in 2014 and 2015. Over 90,000 enrollments worldwide.
Coursera specialization (paid) offered continuously since 2016, with 5744 enrollments. Rating 4.8/5.

Led development of new MS-EE degree as Faculty Associate through campus Provost's office, 2016-18 with ongoing leadership as interim department chair, to be delivered in MOOC form via Coursera. Highly innovative features include:

A professional program directed towards working distance and international learners
Asynchronous and near on-demand offerings
Modular curriculum based on short one-month courses, stackable into larger specializations, certificates, and the MS degree
Performance-based admissions
Low-touch, high student engagement courses, at level equal to campus graduate courses
Approximately 100 credit-hours of material to be offered online
Highly automated and integrated campus and Coursera systems, to reduce degree cost

Program formally launched January 2020.

Publications: in Transactions with Peer Review

Yucheng Gao, Vivek Sankaranarayanan, Ercan M. Dede, Yuqing Zhou, Feng Zhou, Robert W. Erickson, Dragan Maksimović, "Modeling and Design of High-Power, High-Current-Ripple Planar Inductors", *IEEE Transactions on Power Electronics*, vol. 37, no. 5, 2022.

Vivek Sankaranarayanan, Yucheng Gao, Robert W. Erickson, Dragan Maksimovic, "Online Efficiency Optimization of a Closed-Loop Controlled SiC-Based Bidirectional Boost Converter", *IEEE Transactions on Power Electronics*, vol. 37, no. 4, 2022.

Ercan M. Dede, Yucheng Gao, Yuqing Zhou, Vivek Sankaranarayanan, Feng Zhou, Dragan Maksimović, Robert W. Erickson, "Thermal Design, Optimization, and Packaging of Planar Magnetic Components", *IEEE Transactions on Components, Packaging and Manufacturing Technology*, vol. 11, no. 9, 2021.

C. Leung, X. Zhuang, D. Friedrichs, J. Li, R. Erickson, V. Laletin, M. Popov, G. Srinivasan, and D. Viehland, "Highly Efficient Solid State Magnetoelectric Gyrators," Appl. Phys. Lett. 111, 122904 (2017); doi: 10.1063/1.4996242.

H. Chen, H. Kim, R. Erickson, and D. Maksimovic, "Electrified Automotive Powertrain Architecture Using Composite DC-DC Converters," *IEEE Transactions on Power Electronics*, vol. 32, no. 1, pp. 98-116, Jan 2017.

H. Chen, K. Sabi, H. Kim, T. Harada, R. Erickson, and D. Maksimovic, "A 98.7% Efficient Composite Converter Architecture with Application-Tailored Efficiency Characteristic," *IEEE Transactions on Power Electronics*, vol. 31, no. 1, pp. 101-110, Jan. 2016.

Y. Levron, S. Canaday, and R. Erickson, "Bus Voltage Control with Zero Distortion and High Bandwidth for Single-Phase Solar Inverters," *IEEE Transactions on Power Electronics*, vol. 31, no. 1, pp. 258-269, Jan. 2016.

Y. Levron and R. Erickson, "High Weighted Efficiency in Single-Phase Solar Inverters by a Variable Frequency Peak Current Controller," *IEEE Transactions on Power Electronics*, vol. 31, no. 1, pp. 248-257, Jan. 2016.

Y. Levron, H. Kim, and R. Erickson, "Design of EMI Filters Having Low Harmonic Distortion in High Power Factor Rectifiers," *IEEE Transactions on Power Electronics*, vol. 29, no. 7, pp. 3403-3413, July 2014.

D. Jones and R. Erickson, "Buck-Boost Converter Efficiency Maximization via a Nonlinear Digital Control Mapping for Adaptive Effective Switching Frequency," *IEEE Journal of Emerging and Selected Topics in Power Electronics*," vol. 1, no. 3, pp. 153-165, Sept. 2013 (invited paper).

D. Jones and R. Erickson, "Probabilistic Analysis of a Generalized Perturb and Observe Algorithm Featuring Robust Operation in the Presence of Power Curve Traps," *IEEE Transactions on Power Electronics*, vol. 28, no. 6, pp. 2912-2926, June 2013.

S. MacAlpine, R. Erickson, and M. Brandemuehl, "Characterization of Power Optimizer Potential to Increase Energy Capture in Photovoltaic Systems Operating Under Nonuniform Conditions," *IEEE Transactions on Power Electronics*, vol. 28, no. 6, pp. 2936-2945, June 2013.

D. Jones and R. Erickson, "Analysis of Switching Circuits through Incorporation of a Generalized Diode Reverse Recovery Model into State Plane Analysis," *IEEE Transactions on Circuits and Systems I*, vol. 60, no. 2, pp. 479-490, Feb. 2013.

D. Jones and R. Erickson, "A Nonlinear State Machine for Dead Zone Avoidance and Mitigation in a Synchronous Noninverting Buck-Boost Converter," *IEEE Transactions on Power Electronics*, vol. 28, no. 1, pp. 467-480, Jan. 2013.

D. Friedrichs, R. Erickson, and J. Gilbert, "A New Dual Current-Mode Controller Improves Power Regulation in Electrosurgical Generators," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 6, no. 1, pp. 39-44, Jan. 2012.

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 Recitifiers 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 3ø 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

Robert W. Erickson and Katherine Kim, “Developing the Power Electronics Workforce through MOOC Degree Programs and Public Educational Videos,” *IEEE Applied Power Electronics Conference*, invited plenary presentation, March 20, 2023.

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

Y. Gao, V. Sankaranarayanan, R. Erickson and D. Maksimovic, “Soft Startup Strategies for DAB-Based DCX in Composite Converters," *IEEE Energy Conversion Congress and Exposition* (ECCE) 2020, pp. 6130-6135.

A. Ghosh, V. Sankaranarayanan and Robert Erickson, "Transient Mitigation in Mode Transitions for Composite DC-DC Converters," *IEEE Energy Conversion Congress and Exposition* (ECCE) 2020.

A. Ghosh and R. Erickson, "Drive Cycle Based Reliability Analysis of Composite DC-DC Converters for Electric Vehicles," 2020 *IEEE Transportation Electrification Conference & Expo* (ITEC).

Y. Gao, V. Sankaranarayanan, R. Erickson and D. Maksimovic, "Analysis and Attenuation of Differential-Mode Resonances due to Winding Capacitances in High-Power Planar Transformers," *IEEE Applied Power Electronics Conference* (APEC), March 2020, pp. 1411-1417.

V. Sankaranarayanan, Y. Gao, R. Erickson and D. Maksimovic, "Online Efficiency Optimization of a Closed-Loop Controlled SiC-Based Boost Converter," *IEEE Applied Power Electronics Conference* (APEC), March 2020, pp. 285-291.

A. Ghosh and R. Erickson, "Efficiency Maximization using SiC Multi-Die Asymmetric Configurations for Composite DC-DC Converters," *IEEE Workshop on Wide Bandgap Power Devices and Applications* (WiPDA), October 2019.

Y. Gao, V. Sankaranarayanan, E. Dede, A. Ghosh, D. Maksimovic, and R. Erickson, "Drive Cycle Optimized 99% Efficient SiC Boost Converter Using Planar Inductor with Enhanced Thermal Management," *IEEE Workshop on Control and Modeling for Power Electronics* (COMPEL), June 2019.

V. Sankaranarayanan, M. Shirazi, Y. Gao, A. Ghosh, R. Erickson, and D. Maksimovic, "Controller Hardware-In-The-Loop Validation of a Modular Control Architecture for a Composite DC-DC Converter," *IEEE Workshop on Control and Modeling for Power Electronics* (COMPEL), June 2019.

Aritra Ghosh, Manuel Cereijido Fernandez, and Robert Erickson, "Drive Cycle Based Multi-Objective Optimization of 50kW SiC Composite Converter System for Electric Vehicles," *IEEE Workshop on Wide Bandgap Power Devices and Applications* (WiPDA), October 2019.

Aritra Ghosh and Robert Erickson, "Efficiency Maximization Using SiC Multi-Die Asymmetric Configuration for Composite Converters," *IEEE Workshop on Wide Bandgap Power Devices and Applications* (WiPDA), October 2019.

J. Zhu, H. Kim, H. Chen, R. Erickson, and D. Maksimovic, "High Efficiency SiC Traction Inverter for Electric Vehicle Applications," *IEEE Applied Power Electronics Conference*, pp. 1428-1433, March 2018.

U. Anwar, R. Erickson, D. Maksimović, and K. Afridi, "A control architecture for low current distortion in bridgeless boost power factor correction rectifiers," IEEE Applied Power Electronics Conference and Exposition (APEC), pp. 82-87, March 2017.

H. Kim, H. Chen, Z. Cole, B. Passmore, K. Olejniczak, R. Erickson, and D. Maksimovic, "SiC Electric Vehicle Composite Boost Converter with 23 kW/L Power Density," *IEEE Applied Power Electronics Conference*, March 2017.

Kim H, Chen H, Zhu J, Maksimovic D, Erickson R, "Impact of 1.2kV SiC-MOSFET EV traction inverter on urban driving," *IEEE Workshop on Wide Bandgap Power Devices and Applications,* pp. 78-83, Nov. 2016.

H. Kim, H. Chen, D. Maksimovic and R. Erickson "Boost Composite Converter Design Based On Drive Cycle Weighted Losses in Electric Vehicle Powertrain Applications," *IEEE Energy Conversion Congress and Exposition* (ECCE), September 2016.

Anwar U, Kim H, Chen H, Erickson R, Maksimovic D, Afridi K, "A High Power Density Drivetrain-Integrated Electric Vehicle Charger," *IEEE Energy Conversion Congress and Exposition* (ECCE), September 2016.

McHugh C, Sinha S, Meyer J, Pervaiz S, Lu J, Zhang F, Chen H, Kim H, Anwar U, Kumar A, Sepahvand A, Jensen S, Choi B, Seltzer D, Erickson R, Maksimovic D, Afridi KK, "A High Power Density Single-Phase Inverter Using Stacked Switched Capacitor Energy Buffer," *IEEE Applied Power Electronics Conference and Exposition* (APEC), Mar 2016.

H. Kim, H. Chen, D. Maksimovic, and R. Erickson, "Design of a High Efficiency 30 kW Boost Composite Converter," *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, pp. 4243-4250, Sept. 2015.

H. Chen, K. Sabi, T. Harada, R. Erickson, and D. Maksimovic, "A 98.7% Efficient Composite Converter Architecture With Application-Tailored Efficiency Characteristic," *Proceedings of 2014 IEEE Energy Conversion Congress and Exposition*, September 2014.

R. White, G. Miller, B. Dudman, and R. Erickson, "Recent Developments in GaAs Power Switching Devices Including Device Modeling," *IEEE Applied Power Electronics Conference,* March 2014.

S. MacAlpine, C. Deline, M. Brandemuehl, and R. Erickson, "Measured module performance variation and the opportunity for distributed power electronics: analysis of 27 PV arrays in the southwestern US," *IEEE Photovoltaic Specialists Conference* (PVSC), Tampa FL, June 2013.

S. MacAlpine, C. Deline, R. Erickson, and M. Brandemuehl, "Module Mismatch Loss and Recoverable Power in Unshaded PV Installations," *38th IEEE Photovoltaic Specialists Conference* (PVSC), June 2012.

S. MacAlpine, M. Brandemuehl, and R. Erickson, "Beyond the Module Model and Into the Array: Mismatch in Series Strings," *38th IEEE Photovoltaic Specialists Conference* (PVSC), June 2012.

S. MacAlpine, M. Brandemuehl, and R. Erickson, “Potential for Recoverable Power: Simulated Use of Distributed Power Converters and Various Levels in Partially Shaded Photovoltaic Arrays,” *27th Photovoltaic Solar Energy Conference and Exhibition* (PVSEC), Sept. 2011.

D. Friedrichs, R. Erickson, and J. Gilbert, “A New System Architecture Improves Output Power Regulation in Electrosurgical Generators,” *33rd Annual International IEEE Engineering In Medicine and Biology Society Conference*, Aug. 2011.

S. MacAlpine, M. Brandemuehl, L. Linares, and R. Erickson, “Analysis of Potential for Mitigation of Building-Integrated PV Array Shading Losses Through Use of Distributed Power Converters,” *ASME Fourth International Conference on Energy Sustainability*, July 2010.

R. Erickson and A. Rogers, “A Microinverter for Building-Integrated Photovoltaics,” *IEEE Applied Power Electronics Conference*, Feb. 2009, pp. 911-917.

L. Linares, R. Erickson, S. MacAlpine, and M. Brandemuehl, “Improved Energy Capture in Series String Photovoltaics via Smart Distributed Power Electronics,” *IEEE Applied Power Electronics Conference*, Feb. 2009, pp. 904-910.

S. MacAlpine, M. Brandemuehl, L. Linares, and R. Erickson, “Effect of Distributed Power Conversion on the Annual Performance of Building-Integrated PV Arrays with Complex Roof Geometries,” *ASME Third International Conference on Energy Sustainability*, July 2009.

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.

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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.

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Conference Tutorial Seminars, Workshops, and Other Presentations

R. Erickson, "Complexity and Modularity in High-Power SiC Converter Architectures," *IEEE International Symposium on Industrial Electronics*, invited (paid) presentation, June 12, 2019.

R. Erickson and D. Maksimovic, "Directions in Power Electronics for Photovoltaics," DOE Sunshot Workshop: Enabling High Penetration PV Through Next-Generation Power Electronics Technologies, invited presentation, Oct. 11, 2016, Golden CO.

R. Erickson and D. Maksimovic, "Technology Advances in Power Electronics via WBG Converter Circuits," ARPA-E Workshop on Novel Power Electronic Systems Enabled by Wide Bandgap Semiconductors, invited kickoff presentation, September 13 2016, Washington DC.

William Kuskin, Mike Dubson, Robert Erickson, Shalom Ruben, and Sriram Sankaranarayanan, "MOOCs at the University of Colorado at Boulder", *COLTT Conference*, University of Colorado, Aug 6 2014.

Erickson, Maksimovic, Afridi, Olejniczakm McNutt, and Passmore, "A disruptive approach to electric vehicle power electronics," Poster session, DOE VTI kickoff meeting, Oak Ridge National Lab, November 2014.

S. MacAlpine, M. Brandemuehl, and R. Erickson, "Quantifying mismatch losses in small arrays," *Sandia PV Performance Modeling Workshop*, Santa Clara, CA, May 1-2 2013.

R. Erickson, "The Future of Photovoltaic Power Electronics," *IEEE Applied Power Electronics Conference*, invited presentation, Feb 2009.

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.

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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

IEEE Industrial Electronics Society Young Professionals and Students Mentor, 2019.
Reviewer for DOE programs: ARPA-E panels 2014, 2015, and 2018; Vehicle Technologies program 2015, 2016, 2017.
Session Chair, IEEE PVSC, June 2013.
Program Chair, IEEE COMPEL, 2010.
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 chariman, “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, ECEE Interim Department Chair, 2014-15 and 2018-20.
Faculty Associate (Provost’s office) for development of MOOCs and online MS degrees, Feb. 2016-2018.
ECE Executive Committee: member, 1999 – 2002 and 2015-18.
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 CAETE, 2001-present.
Developed and directed Professional Master’s program in Power Electronics, 2015-present.
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 D^3C: 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.

24. Leonor Linares, M.S. Thesis, “Design and Implementation of Module Integrated Converters for Series Connected Photovoltaic Strings,” May 2009.

25. Daniel Friedrichs, Ph.D. Thesis, “Current-Programmed Mode Control Strategies for Electrosurgical Generators,” Nov. 2011.

26. David C. Jones, Ph.D. Thesis, “Control Techniques for the Maximization of Power Converter Robustness and Efficiency in a Parallel Photovoltaic Architecture,” April 2013.

27. Hua Chen, Ph.D. Thesis, “Advanced Electrified Automotive Powertrain with Composite DC-DC Converter,” April 2016.

28. Hyeokjin Kim, Ph.D. Thesis, “98% CAFE EV Power Conversion System Design,” December 2016.