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Professor

Director, Colorado Power Electronics Center
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- Ph.D., Electrical Engineering** January 1989
California Institute of Technology, Pasadena
Thesis topic: Synthesis of PWM and Quasi-Resonant DC-to-DC Power Converters
- M.S., Electrical Engineering** June 1986
University of Belgrade, Yugoslavia
- B.S., Electrical Engineering** June 1984
University of Belgrade, Yugoslavia

EXPERIENCE:

- Professor** August 2006 to Present
Dept. of Electrical and Computer Engineering, University of Colorado, Boulder
- Director, Colorado Power Electronics Center** August 1999 to Present
Dept. of Electrical and Computer Engineering, University of Colorado, Boulder
- Associate Professor** August 1999 to July 2006
Dept. of Electrical and Computer Engineering, University of Colorado, Boulder
- Assistant Professor** August 1992 to July 1999
Dept. of Electrical and Computer Engineering, University of Colorado, Boulder
- Assistant Professor** September 1989 to July 1992
University of Belgrade, Yugoslavia
- Research Fellow** January 1989 to August 1989
California Institute of Technology, Pasadena
- Graduate Research Assistant** January 1989 to August 1989
California Institute of Technology, Pasadena
- Graduate Teaching/Research Assistant** July 1984 to July 1986
University of Belgrade, Yugoslavia

RESEARCH PROJECTS:

Sponsored projects

NSF Engineering Research Center: Advancing Sustainability through Powered Infrastructure for Roadway Electrification (ASPIRE)

2021-2031, CU-Boulder Co-Principal Investigator, project sponsored by NSF.
Partners: Utah State University (lead), University of Texas El Paso, Purdue University

Data-Driven Design Automation Techniques for Power Electronics

2021-2022, Principal Investigator, project sponsored by Lockheed Martin.

Modular Wide-Bandgap String Inverters for Low-Cost Medium-Voltage Transformerless PV Systems

2018-2021, CU-Boulder Principal Investigator, project sponsored by DOE Solar Energy Technology Office. Partners: U of Washington (lead), NREL, Wolfspeed.

A High-voltage, High-reliability Scalable Architecture for Electric Vehicle Power Electronics

2018-2021, Co-Principal Investigator, PI: Prof. Erickson. Project sponsored by ARPA-E CIRCUITS program. Partners: NREL, Wolfspeed, Toyota.

Multi-Level Power Conversion

2019-2021, Principal Investigator, project sponsored by Advanced Energy

High-Efficiency, Ultra-High Density Power Converters

2019-2021, Principal Investigator, project sponsored by Lockheed Martin

Modular Architecture and Algorithms for Wide Bandgap Energy Conversion in Utility-Scale Wind and Solar

2017-2019, Principal Investigator, project sponsored by NREL

Converter Topologies and Control for Multiple-Voltage-Domain Power Distribution

2017-2019, Principal Investigator, project sponsored by Lockheed Martin

Modeling, Control and Design of Bypass Converters for Plug-and-Play Energy Storage Architecture

2017-2018, Principal Investigator, collaboration project with USU, sponsored by ONR

GATE Center for Innovative Drivetrains in Electric Automotive Technology Education (IDEATE)

2011-2019, Co-Principal Investigator, collaboration project with UCCS, sponsored by DOE GATE program

Microchip power distribution in support of DAHI

2017, Principal Investigator, collaboration project with Lockheed Martin, sponsored by DARPA DAHI program

A Disruptive Approach to Electric Vehicle Power Electronics

2015-2017, Co-Principal Investigator, project sponsored by DOE Vehicle Technologies Incubator program

Robust Cell-Level Modeling and Control of Large Battery Packs

2013-2017, Principal Investigator at CU-Boulder, project sponsored by ARPA-E AMPED program, collaboration with USU, UCCS, NREL and Ford

I/UCRC Planning Grant

2015, Principal Investigator at CU-Boulder, sponsored by NSF, collaboration with ASU, Dartmouth College, OSU

High-Efficiency Boost DC-DC Converter

2013-2014, Co-Principal Investigator, project sponsored by Toyota Motor Corporation

Boost DC-DC Converter and Controller

2012, Principal Investigator, project sponsored by Toyota Motor Corporation

Wafer-Level Sub-Module Integrated DC/DC Converter

2012-2015, Principal Investigator, project sponsored by ARPA-E Solar ADEPT program, collaboration with NREL and Nuvotronics

Vector Split Polar (VeSP) Transmitter

2012-2015, Co-Principal Investigator, project sponsored by DARPA MPC program

Buck DC-DC Converters Using GaN HEMT

2012-2015, Principal Investigator, collaboration project with TQS, sponsored by DARPA MPC program

Power System Converters and Control

2011-2012, Co-Principal Investigator, project sponsored by Raytheon

DC-DC Battery Charger for Grid-Interactive PV Power System

2010-2012, Principal Investigator, collaboration project with Satcon, sponsored by Hawaii Renewable Energy Development Venture/DOE

Energy Management System Algorithms for Microgrids

2011-2012, Principal Investigator, project sponsored by Intel Corp.

Field Study of Plug-In Hybrid Electric Vehicles

2010-2012, Co-Principal Investigator, project sponsored by Toyota Motor Sales, USA.

Modeling, Simulation and Control of Micro-Grids with Significant Electric-Vehicle Penetration

2010-2011, Principal Investigator, project sponsored by Intel Corp.

Power Management System with Smart DC-DC Converters

2010-2011, Principal Investigator, Phase II STTR project sponsored by In-Scope Solutions.

Smart DC-DC Converter Modules

2011, Principal Investigator, project sponsored by Northrop Grumman Space Technology.

High-Efficiency RF Transmitters

2009-2010, Principal Investigator, project sponsored by National Semiconductor, Co-PI: Z.Popovic

Adaptive Control of Multi-Output DC-DC controllers

2009-2010, Principal Investigator, project sponsored by Northrop Grumman Space Technology.

Power Management System

2008, Co-Principal Investigator, with R.Erickson and A.Gasiewski, Phase I STTR project sponsored by In-Scope Solutions.

Auto-tuning DC-DC controllers

2008, Principal Investigator, project sponsored by Northrop Grumman Space Technology.

Techniques for High Efficiency High Power Solid State RF Amplifiers

2006-2008, Co-Principal Investigator, project sponsored by SAIC, PI: Z. Popovic.

Robust Integrated Power Electronics (RIPE)

2005-2007, Co-Principal Investigator, project supported by DARPA through GE Research, PI: R.Zane.

High-Efficiency RF Power Amplifiers based on Delta-Sigma Modulation

2005-2007, Co-Principal Investigator, project supported by ONR, PI: Z.Popovic.

GAANN-HYSE (Hybrid-Signal Electronics) Fellowship Program

2004-2007, Co-Principal Investigator, sponsored by the US Department of Education, PI: Z.Popovic.

Power management for High-Efficiency RF Power Amplifiers

2002-2006, Co-Principal Investigator, project sponsored by the DARPA IRFFE program, PI: Z.Popovic.

High-Performance, Low-Power Wireless Communication

1997-2002, Co-Principal Investigator, project sponsored by NSF, PI: M. Varanasi, Co-PI's: Z. Popovic, T. Brown.

Computer-Aided Analysis of Power Electronic Systems

1997-2002, Principal Investigator, NSF CAREER Award.

Mixed-Signal Integrated Controllers for High Quality Power Rectifiers

1998-1999, Principal Investigator, CU Summer Session Research Grant.

Analysis of Spacecraft Electrical Power Converters

1997, Co-Principal Investigator, sponsored by Lockheed Martin Corp, PI: R. Erickson.

New Approaches to Simulation and Control of Power Electronic Systems

1993-1997, Principal Investigator, NSF Research Initiation Award.

Power Management for Portable Systems,

1994-1997, Principal Investigator, CAMPmode.

Electric Vehicle Single-Phase Battery Chargers

1992-1994, Co-Principal Investigator, General Motors Corporation, PI: R. Erickson.

Colorado Power Electronics Center (CoPEC) sponsored projects

- **Synthesis of Ultra-High-Efficiency Converter Architectures**, 2021-2022, Principal Investigator, CoPEC project sponsored by Texas Instruments.
- **Auto-tuning of digitally controlled buck or boost converters**, 2021-2022, Principal Investigator, CoPEC project sponsored by Dialog Semiconductor.
- **High-frequency automotive LED drivers**, 2015-2021, Principal Investigator, CoPEC project sponsored by Texas Instruments.
- **High-frequency digitally controlled buck or boost converters**, 2019-2020, Principal Investigator, CoPEC project sponsored by Dialog Semiconductor.
- **High-efficiency dc-dc converters**, 2014-2018, Co-PI, CoPEC project sponsored by Huawei
- **High-efficiency, high step-down dc-dc converters**, 2014-2018, Co-PI, CoPEC project sponsored by Texas Instruments.
- **Stacked ac systems**, 2015-2017, Principal Investigator, CoPEC project sponsored by Empower

- **High-efficiency boost power conversion**, 2017, Principal Investigator, CoPEC project sponsored by Suntech Drive
- **Second-order sliding mode control**, 2013-2015, Principal Investigator, CoPEC project sponsored by Maxim
- **Digital control of inverters for electrosurgical generators**, 2010-2015, Principal Investigator, CoPEC project sponsored by Covidien
- **Power converters and power management techniques in servers**, 2010-2014, Principal Investigator, CoPEC project sponsored by Texas Instruments
- **Integrated DC-DC converters**, 2011-2012, Principal Investigator, CoPEC project sponsored by Qualcomm
- **High-efficiency tracking power supplies for RF power amplifiers in base stations**, 2007-2009, and 2012-2014, Principal Investigator, CoPEC project sponsored by Texas Instruments
- **Efficiency modeling and optimization in single-phase PFC rectifiers**, 2007-2010, Principal Investigator, CoPEC project sponsored by Cirrus Logic
- **Adaptive control of digitally controlled PFC rectifiers**, 2009-2011, Principal Investigator, CoPEC project sponsored by Delta Electronics
- **Digital control of phase-shifted DC-DC converters**, 2008-2010, Principal Investigator, CoPEC project sponsored by Covidien
- **On-line efficiency optimization**, 2009-2011, Principal Investigator, CoPEC project sponsored by Texas Instruments
- **Design optimization in digital controllers for DC-DC converters**, 2008-2010, Principal Investigator, CoPEC project sponsored by Analog Devices, Co-PI: R.Zane
- **Multi-phase and multi-level converters for low-power applications**, 2008-2009, Principal Investigator, CoPEC project sponsored by Freescale Semiconductor
- **Adaptive control of DC-DC converters**, 2008-2009, Principal Investigator, CoPEC project sponsored by National Semiconductor
- **Time-optimal digital control of switched-mode power converters**, 2007-2009, Principal Investigator, CoPEC project sponsored by Primarion
- **Integrated digitally-controlled point-of-load power supplies**, 2004-2009, Principal Investigator, CoPEC project sponsored by Toshiba
- **Adaptive power management and tuning for RF power amplifiers**, 2006-2010, Principal Investigator, CoPEC project sponsored by National Semiconductor, Co-PI: Z.Popovic.
- **Digital PFC control**, 2005-2009, Principal Investigator, CoPEC project sponsored by Texas Instruments
- **Sensorless dead-time optimization**, 2005-2007, Principal Investigator, CoPEC project sponsored by Texas Instruments.

- **Auto-tuning techniques for point-of-load converters**, 2006-2007, Co-Principal Investigator, CoPEC project sponsored by Astec/Artesyn, PI: R.Zane.
- **Health monitoring in PMAD systems through power converter modules with direct digital control**, 2006-2007, Co-Principal Investigator, CoPEC project sponsored by NASA, PI: R.Zane.
- **Multi-phase digital pulse-width modulator**, 2005-2006, Principal Investigator, CoPEC project sponsored by Intel. Co-PI: R.Zane.
- **High-speed multi-phase digital controller**, 2005-2006, Principal Investigator, CoPEC project sponsored by Intel, Co-PI: R.Zane.
- **Digital current-mode control**, 2003-2005, Principal Investigator, CoPEC project sponsored by Texas Instruments.
- **Envelope-tracking power supply for RF power amplifiers in portable applications**, 2004-2006, Principal Investigator, CoPEC project sponsored by National Semiconductor, Co-PI: Z.Popovic.
- **Digital control of multi-phase converters**, 2003-2005, Co-Principal Investigator, CoPEC project sponsored by Artesyn Technologies, PI: R.Zane.
- **Stability control in PMAD systems through power converter modules with direct digital control**, 2003-2005, Co-Principal Investigator, CoPEC project sponsored by NASA, PI: R.Zane.
- **CoPEC/Northrop Grumman associate sponsorship**, 2005-ongoing, Co-Principal Investigator, sponsored by Northrop Grumman, Co-PI's: R.Erickson, R.Zane.
- **CoPEC/Zilker Labs associate sponsorship**, 2003-ongoing, Co-Principal Investigator, Co-PI's: R.Erickson, R.Zane.
- **CoPEC/Intersil associate sponsorship**, 2003-2004, Co-Principal Investigator, sponsored by Intersil, Co-PI's: R. Erickson, R. Zane.
- **Digital PWM controller for low-power portable applications**, 2003-2004, Principal Investigator, CoPEC project sponsored by National Semiconductor.
- **Feed-forward digital pulse-width modulators**, 2003-2004, Principal Investigator, CoPEC project sponsored by National Semiconductor.
- **Calibrated delay-line A/D converters**, 2002, Principal Investigator, CoPEC project sponsored by National Semiconductor.
- **High-frequency digital PWM controllers**, 2000-2001, Principal Investigator, CoPEC project sponsored by National Semiconductor.
- **Dual-mode digitally-controlled inverter for photovoltaic applications**, 2003, Principal Investigator, CoPEC project sponsored by Philips Research.
- **Synthesis and digital control of universal-input power-factor correctors with reduced stresses**, 2000-2002, Co-Principal Investigator, CoPEC project supported by Philips Research, Co-PI: R.Erickson.
- **Digital control of isolated DC-DC converters**, 1999-2000, Principal Investigator, CoPEC project supported by Tyco Electronics, Co-PI: R.Erickson.

- **High-performance power-factor correctors for avionics**, 2000-2002, Co-Principal Investigator, CoPEC project supported by Rockwell Collins, Co-PI: R.Erickson.
- **Converter topologies and control for solid-state LED lighting**, 2001, Co-Principal Investigator, CoPEC project supported by Philips Advance, Co-PI: R.Erickson.

AWARDS and RECOGNITIONS:

- **Fellow of the IEEE**, 2014
- **Distinguished Lecturer**, IEEE Power Electronics Society, 2011-2017
- **Modeling and Control Technical Achievement Award**, IEEE Power Electronics Society, 2012
- **Boulder Faculty Assembly Excellence in Teaching Award**, 2013
- **College of Engineering Faculty Research Award**, College of Engineering and Applied Sciences, University of Colorado, 2020.
- **Charles Hutchinson Memorial Teaching Award**, College of Engineering and Applied Sciences, University of Colorado, 2012.
- **Department Research Award**, ECEE Department, CU Boulder, 2017.
- **Department Service Award**, ECEE Department, CU Boulder, 2015.
- **Bruce Holland Excellence in Teaching Award**, ECEE Department, CU Boulder, 2004, 2011, and 2018.
- **Best Paper Award**, IEEE Transactions on Energy Conversion 2019-2020, for the paper: P. K. Achanta, B. B. Johnson, G.-S. Seo, and D. Maksimovic, "A multilevel DC to three-phase AC architecture for photovoltaic power plants," *IEEE Trans. Energy Conv.*, vol. 34, no. 1, pp. 181–190, Mar. 2019.
- **Transactions Second Prize Paper Award**, IEEE Power Electronics Society, 2016, for the paper: C. Olalla, C. Deline, D. Clement, Y. Levron, M. Rodriguez, D. Maksimovic, "Performance of Power-Limited Differential Power Processing Architectures in Mismatched PV Systems" *IEEE Trans. Power Electron.*, vol. 30, no. 2, Feb 2015.
- **Transactions Prize Letter Award**, IEEE Power Electronics Society, 2010, for the paper: J. Morroni, R. Zane, D. Maksimovic, "Design and implementation of an adaptive tuning system based on desired phase margin for digitally controlled DC–DC converters," *IEEE Trans. Power Electron.*, vol. 24, no. 2, pp. 559 – 564, Feb 2009.
- **Transactions Prize Letter Award**, IEEE Power Electronics Society, 2008, for the paper: D.Maksimovic, R.Zane, "Small-signal discrete-time modeling of digitally controlled PWM converters," *IEEE Trans. on Power Elect.*, Vo.22, No.6, pp.2552-2556, Nov.2007
- **Second Prize Paper Award**, IEEE Industry Application Society, 2015, for the paper: M.M.U.Rehman, M.Evzelman, K.Hathaway, R.Zane, G.Plett, K.Smith, E.Wood, D.Maksimovic, "Modular approach for continuous cell-level balancing to improve performance of large battery packs," presented at IEEE ECCE 2014.
- **CU-Boulder Inventor of the Year Award**, 2006
- **Transactions Prize Paper Award**, IEEE Power Electronic Society, 1997, for the paper "Nonlinear-carrier control for high power factor boost rectifiers," *IEEE Transactions on Power Electronics*, Vol.11, No.4, July 1996, pp.578-584, with Y.Jang and R.Erickson.

- **NSF CAREER Award**, 1997.
- **NSF Research Initiation Award**, 1993.
- **Best Paper Award**, HFPC Conference, 1989, for the paper “Switching converters with large range of DC conversion ratios,” with S.Cuk.
- **Fullbright Fellowship**, 1986.
- **Caltech Graduate Fellowship**, 1986
- **City of Belgrade Award** for the outstanding academic record, 1984.
- **Best Electrical Engineering Graduate Award**, University of Belgrade, 1984.

TEACHING:

- **Courses taught and developed:**

- **Modeling and Control of Power Electronics**, a 5-course MOOC sequence offered through Coursera, 2020-ongoing; developed
- **Power Electronics Specialization**, a 6-course MOOC sequence offered through Coursera, 2016-ongoing; introduced and developed with R. Erickson and K. Afridi; authored Advanced Converter Control Techniques (course 4 in the sequence), co-authored Capstone Design Project in Power Electronics (course 6 in the sequence). <https://www.coursera.org/specializations/power-electronics>
- **Power Electronics for Electric Drive Vehicles** (ECEN5007, graduate-level); introduced and developed in Fall 2012 as part of the DOE GATE sponsored Innovative Drivetrains in Electric Automotive Technology Education (IDEATE) program and a new graduate certificate program; offered on-campus and on-line;
- **Electronics Design Laboratory** (ECEN2270, sophomore-level laboratory); introduced and developed in 2011; now a core course in the new EE/ECE curriculum;
- **Renewable sources and efficient electrical energy systems** (ECEN2060, sophomore-level); introduced and developed 2008-2010; now a sophomore elective in the EE/ECE curriculum
- **Introduction to Microelectronic Circuits** (ECEN 3250, junior-level); a core EE/ECE undergraduate course; developed new lecture and lab materials
- **Power Electronics Lab** (ECEN4517/5517, senior/graduate); developed new lab materials (with R. Erickson)
- **Analog IC design** (ECEN 4827/5827, senior/graduate); introduced and developed (with R. Zane); offered on-campus and on-line.
- **EE Capstone Design Lab**; introduced and developed in 2001; now integrated with ECE/EE senior capstone design laboratory.
- **Introduction to Power Electronics** (ECEN 4797/5797, senior/graduate); contributed to development (with R. Erickson); offered on-campus and on-line; ecee.colorado.edu/~ecen5797
- **Advanced modeling and control techniques in power electronics** (ECEN 5807, graduate); contributed to development (with R. Erickson); offered on-campus and on-line;
- **Resonant and soft-switching techniques in power electronics** (ECEN 5817, graduate); contributed to development (with R. Erickson);
- **Energy conversion** (ECEN 3170, junior); contributed lecture materials.
- **Advanced electronics lab** (ECEN 4618); developed new lab materials; led to development of ECEN2830.

- **Teaching accomplishments:**

- Serving as *Co-Director of the Engineering Workforce Development* in the ASPIRE NSF ERC, 2020-present
- *The Charles Hutchinson Memorial Teaching Award*, CU-Boulder College of Engineering and Applied Science, 2012.
- Received DOE GATE program grant to introduce a new *Graduate Certificate in Electric Drivetrain Technology* and curriculum in Innovative Drivetrains in Electric Automotive Technology Education (IDEATE), collaboration with R.Zane (USU), G.Plett and S.Trimboli (UCCS), 2012-2019.
- *Distinguished lecturer* of the IEEE Power Electronics Society, 2011-2017.
- *Bruce Holland Excellence in Teaching Award*, ECEE Department, University of Colorado, 2004, 2011, 2018.
- Co-author of the third edition of the textbook *Fundamentals of Power Electronics*, Springer 2020, with Prof. R. Erickson. The textbook has been adopted at numerous schools worldwide and is considered a standard reference by professionals and researchers in the field of Power Electronics; more than 15,000 copies in circulation, more than 11,000 citations in research publications.
- With Prof. R. Erickson, introduced and developed curriculum (ECEN5797, ECEN5807, ECEN5817) for the *Professional Certificate in Power Electronics*, available both on-campus and on-line for continuing education students.
- Graduated 45 Ph.D. students, currently advising a group of 5 Ph.D. students.
- Member of the ECEE Department Curriculum Committee, 2002-2010; contributed to the development of the new EE/ECE curriculum.

- **Graduate student supervision (Ph.D. Thesis):**

- **Skye Reese**, Ph.D. candidate, data-driven design automation (in progress)
- **Chandan Suthar**, Ph.D. candidate, multi-level converters (in progress)
- **Janko Celikovic**, Ph.D. candidate, digitally controlled converters, multi-level converters (in progress)
- **Branko Majmunovic**, Ph.D. candidate, modular grid-tied power electronics (in progress)
- **Satyaki Mukherjee**, Ph.D. 2021, Thesis: Wide Range DC-DC Power Conversion Systems - Architectures, Circuits and Components
- **Vivek Sankaranarayanan**, Ph.D. 2021, Thesis: Control Strategies for Efficiency Optimization of Composite Converters
- **Yucheng Gao**, Ph.D. 2021, Thesis: Design and Optimization of a 100 kW Composite Converter for Electric Vehicle Drivetrain

- **Kyle Goodrick**, Ph.D. 2021, Systematic Optimization of Multiple Voltage Domain DC Distribution Architectures, ECEE Department Best PhD Thesis award.
- **Jianglin Zhu**, Ph.D. 2020, Transformerless Stacked Active Bridge Converters: Analysis, Synthesis and Design.
- **Prasanta Achanta**, Ph.D. 2018, Analysis, Modeling and Control of Stacked DC-AC Converters
- **Yushi Liu**, Ph.D. 2018, Low Profile, High Power Density and High Efficiency DC-DC Converters, co-advisor: Prof. Khurram Afridi
- **Fan Zhang**, Ph.D. 2017, Modeling and Control of a Modular Battery Management
- **Alihossein Sepahvand**, Ph.D. 2017, High Frequency DC-DC Power Conversion for Automotive LED Driver Applications.
- **Anderson Hoke**, Ph.D. 2016, candidate, Electric Vehicle Charge Optimization Including the Costs of Battery Wear, and Active Power Control of Photovoltaic Systems without Storage
- **Fenglong Lu**, Ph.D. 2016, Autonomous Control of Series-Connected Low Voltage Micro-inverters (LVAC) for Photovoltaic (PV) panels
- **Hua Chen**, Ph.D. 2016, Advanced Electrified Automotive Powertrain with Composite DC-DC Converter (completed); co-advisor: Prof. Robert Erickson.
- **Yuanzhe Zhang**, Ph.D. 2015, “High frequency GaN drain supply modulators for RFPAs” (completed)
- **Beom Seok Choi**, Ph.D. 2015, “Differential power processing submodule integrated converters for photovoltaic power systems” (completed)
- **Scott Jensen**, Ph.D. 2015, “Fast tracking current driven electrosurgical generators” (completed)
- **Alexander Brissette**, Ph.D. 2014, “Analysis of the deployment, performance, and design of distributed static series compensators” (completed)
- **Nguyen Hien Minh**, “Smart DC power system controls,” Ph.D., 2014 (completed)
- **Joshua Traube**, Ph.D., “Grid-tied power electronics,” 2013 (completed)
- **Daniel Costinett**, Ph.D., power control and management for ultra high-efficiency data servers; co-advisor: Prof. Regan Zane (completed 2013)
- **Mark Norris**, “Envelope tracking converters,” Ph.D. (completed Fall 2012)
- **Yushan Li**, “Integrated Switched-Mode Power Supplies for RF Power Amplifiers in Mobile Applications,” Ph.D. (completed Spring 2012).
- **Sang Hee Kang**, “Efficiency Optimization in Digitally Controlled Flyback DC-DC Converters Over Wide Ranges of Operating Conditions,” Ph.D. (completed Fall 2011)
- **Sung Woo Moon**, “Auto-Tuning of Digitally Controlled Single-Phase Low Harmonic Rectifiers and Inverters,” Ph.D. (completed Spring 2011)

- **Fu-Zen Chen**, “Digital Control Techniques for Efficiency Improvements in Single-Phase Boost Power Factor Correction Rectifiers,” Ph.D. (completed Fall 2010)
- **Barry Mather**, “Digital Control Techniques for Single-Phase Power Factor Correction Rectifiers,” Ph.D. (completed Fall 2010)
- **Xu Zhang**, “Digital Control Techniques for Synchronous Buck DC-DC Converters,” Ph.D. (completed Fall 2009)
- **Jeff Morroni**, “Adaptive Tuning and Monitoring of Digitally Controlled Switched-Mode Power Supplies,” Ph.D. (completed Fall 2009, co-advisor with R.Zane)
- **Mari Shirazi**, “Embedded Frequency Response Measurement Capability for Monitoring and Tuning of System Dynamics in Digitally-Controlled DC-DC Converters,” Ph.D. (completed Fall 2009, co-advisor with R.Zane)
- **Amir Babazadeh**, “Switching Surface Approach for Improved Transient Response in Digitally Controlled DC-DC Power Converters,” Ph.D. (completed Fall 2009)
- **Vahid Yousefzadeh**, “Power Management for RF Power Amplifiers,” Ph.D. (completed August 2006)
- **Yang Zhang**, “Digital Masterless Control for Multi-Phase Switching Power Converters,” Ph.D. (completed August 2007, co-advisor with R.Zane).
- **Xufeng Jiang**, “Switching Power Converters for RF Power Amplifiers,” Ph.D. (completed June 2007).
- **Milan Ilic**, “Digitally-controlled High-Power DC Supplies,” Ph.D. (completed June 2007)
- **Hao Peng**, “Digital current-mode control,” Ph.D. (completed May 2006).
- **Barry Arbetter**, “DC-DC converter design for battery-operated systems,” Ph.D. (completed August 2006).
- **Sandeep Dhar**, “Low-Power Design Using Adaptive Voltage Scaling,” Ph.D. (completed June 2004).
- **Praneet Athalye**, “High-performance power factor correctors for avionics applications,” Ph.D., June 2004 (completed, co-advisor with R.Erickson).
- **Aleksandar Prodic**, “Digital control of switching converters: design and VLSI/DSP implementation,” Ph.D., May 2003 (completed).
- **Kusumal Changtong**, “Magnetics modeling and design for improved cross-regulation,” Ph.D., May 2003 (completed, co-advisor with R. Erickson).
- **Jingquen Chen**, “Topologies and Control of Single-Phase Low-Harmonic Rectifiers,” Ph.D., June 2002 (completed, co-advisor with R. Erickson).
- **Regan Zane**, “Mixed-signal VLSI for Control in Power Electronics,” Ph.D., December 1999 (completed).
- **Predrag Pejovic**, “A Method for Simulation of Power Electronic Systems Using Piecewise-Linear Device Models,” Ph.D. June 1995 (completed)

- **Graduate student supervision (M.S. Thesis or project):**
 - **Phillip Montoya**, M.S. candidate, Monolithic GaN converters, in progress.
 - **Trent Martin**, M.S. candidate, Ultra-fast EV charging architecture, in progress.
 - **Tadakazu Harada**, M.S. candidate, “High-Efficiency DC Transformer”, 2014 (completed)
 - **Dongxue Li**, M.S. candidate, Envelope Tracking Power Supplies, 2014 (completed)
 - **Daniel Clement**, M.S. candidate, sub-module integrated DC-DC converters for PV applications, 2013 (completed)
 - **Greg Stahl**, M.S. candidate, smart DC micro-grids, 2012 (completed)
 - **Shruti Yalamarty**, “Switched-Mode Power Converters for RF Power Amplifiers,” M.S. Spring 2008 (completed)
 - **Bhaskar Ramachandran**, “Dynamic Dead-Time Optimization in Synchronous Buck DC-DC Converters,” M.S., December 2007 (completed)
 - **Toru Takayama**, “Optimization of Monolithic Digitally-Controlled DC-DC Converters,” M.S., December 2006 (completed)
 - **Serge Simonov**, “Inductor Design for Monolithic DC-DC Converters,” M.S., December 2004 (completed)
 - **Asif Syed**, “Feed-forward digital pulse-width modulators,” M.S., May 2004 (completed)
 - **Ershad Ahmed**, “Digital controller for low-power applications,” M.S., May 2004 (completed).
 - **Michael Vincent**, “Design and implementation of a self-calibrated delay-line Analog-to-Digital converter,” M.S., December 2002 (completed).
 - **Ben Patella**, “High-speed, low-power digital PWM controller,” M.S., December 2000 (completed). Received the College Award for Excellence in Scholarship and Research for recognition of his work.
 - **Nagandini Jayaram**, “Power Factor Corrector Based on Coupled-Inductor SEPIC Converter with Nonlinear-Carrier Control,” December 1997, M.S. (completed).
 - **Anders Fagerhaud**, “Nonlinear-Carrier Control for Single-Phase High-Power-Factor Rectifiers,” M.S., December 1996 (completed).
 - **Brede Arntzen**, “Switched-Capacitor DC-DC Converter Design for Low-Power Applications,” M.S., December 1995 (completed).

PUBLICATIONS:

Google Scholar: <https://scholar.google.com/citations?hl=en&user=97xFEH0AAAAJ>

Books:

1. R. W. Erickson, D. Maksimovic, *Fundamentals of Power Electronics*, 3rd edition, Springer 2020.
2. L. Corradini, D. Maksimovic, P. Mattavelli, R. Zane, *Digital Control of High-Frequency Switched-Mode Power Converters*, IEEE Press/Wiley, 2015.
3. E. Alarcon, V. Yousefzadeh, A. Prodic, D. Maksimovic, "Data Conversion Pulse-Width Modulators for Switched-Mode Power Converter Digital Control," Chapter 14 in *Analog Circuit Design*, M. Steyaert, A. Roermund, A. Baschiroto, Editors, Springer 2012.

Journal Articles:

1. M. Kamel, V. Sankaranarayanan, R. Zane and D. Maksimovic, "State-of-Charge Balancing with Parallel and Series Output Connected Battery Power Modules," in *IEEE Transactions on Power Electronics*, Early Access.
2. Y. Gao et al., "Modeling and Design of High-Power, High-Current-Ripple Planar Inductors," in *IEEE Transactions on Power Electronics*, vol. 37, no. 5, pp. 5816-5832, May 2022.
3. V. Sankaranarayanan, Y. Gao, R. W. Erickson and D. Maksimovic, "Online Efficiency Optimization of a Closed-Loop Controlled SiC-Based Bidirectional Boost Converter," in *IEEE Transactions on Power Electronics*, vol. 37, no. 4, pp. 4008-4021, April 2022
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4. A. Sepahvand, D. Maksimovic, K. Afridi, DC-to-DC drivers with high resolution dimming, 10,461,633, 2019.
5. H. Chen, R.W. Erickson, D. Maksimovic, T. Harada, Modular DC-DC converter including a DC transformer module, 10,348,202, 2019
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13. R. Zane, D. Seltzer, D. Maksimovic, B. Jacobson, D. Desrosiers, Zero voltage switching operation of a minimum current trajectory for a dc-dc converter, US patent 9,595,873, 2017.
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15. D. Maksimovic, R. Zane, A. Carosa, Multi-phase modulator, US patent 8,384,365, 2013.
16. D. Maksimovic, V. Yousefzadeh, E. Alarcon, Method, Apparatus & System for Extended Switched-Mode Controller, US patent 8,319,486, 2012.
17. D. Maksimovic, Digital PFC Controller, US patent 8,130,522, 2012.

18. M. Hartman, J. T. Doyle, D. Maksimovic, P. Salmi, J. Pennanen, S. Dhar, System and method for providing multi-point calibration of an adaptive voltage scaling system, US patent 8,151,125, 2012.
19. J. Morroni, R. Zane, D. Maksimovic, Monitoring and control of power converters, US patent 7,956,592, 2011.
20. D.Maksimovic, V.Yousefzadeh, A.Carosa, T.Takayama, Digital pulse-width-modulator with discretely adjustable delay line, US patent 7,977,994
21. D. Maksimovic, V. Yousefzadeh, "Determining dead times in switched-mode DC-DC converters," US patent 7,456,620.
22. D. Maksimovic, A.Syed, E.Ahmed, "Digital pulse-width modulator," US patent 7,271,754.
23. D. Maksimovic, H. Peng, "Differential delay line analog-to-digital converter," US patent 7,315,270.
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26. D. Maksimovic, J. Chen, A. Prodic, R. Erickson, "Predictive Digital Current Controllers for Switching Power Converters," US patent 7,148,669.
27. D. Maksimovic, B. Patella, A. Prodic, "Digital Controller for High Frequency Switching Power Supplies," US patent 7,595,686.
28. M. Hartman, J.T.Doyle, D. Maksimovic, P. Salmi, J. Pennanen, S. Dhar, System and method for providing multi-point calibration of an adaptive voltage scaling system, US patent 7,581,120.
29. J.T.Doyle, D.Maksimovic, Method and system for minimizing power consumption in mobile devices using cooperative adaptive voltage and threshold scaling, US patent 7,493,149.
30. D. Maksimovic, Dhar; Sandeep, Kranzen; Bruno, Ambatipudi; Ravindra, Adaptive voltage scaling digital processing component and method of operating the same, US patent 7,117,378.
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32. Maksimovic; Dragan, Doyle; James Thomas , Serial digital communication superimposed on a digital signal over a single wire, US patent 7,079,589.
33. Maksimovic; Dragan, Dhar; Sandeep, Method and system for providing self-calibration for adaptively adjusting a power supply voltage in a digital processing system, US patent 7,024,568.
34. D. Maksimovic, S. Dhar, "Adaptive Voltage Regulator for Powered Digital Devices," US patent 7,061,292.

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37. M. Vincent, D. Maksimovic, "Matched delay line voltage converter," US patent 6,958,721.
38. B. Kranzen, D. Maksimovic: Adaptive voltage scaling clock generator for use in a digital processing component and method of operating the same, US Patent 6,944,780.
39. J. T. Doyle, D. Maksimovic, Y. Li: Method and system for providing power management in a radio frequency power amplifier using adaptive envelope tracking, US Patent 6,914,487.
40. J. T. Doyle, D. Maksimovic, Y. Li: Method and system for providing power management in a radio frequency power amplifier by dynamically adjusting supply and bias conditions, US Patent 6,900,697
41. D. Maksimovic, S. Dhar, B. Kranzen, R. Ambatipudi: Adaptive voltage scaling digital processing component and method of operating the same, US Patent 6,868,503
42. D. Maksimovic, S. Dhar, R. Ambatipudi, B. Kartzen: Adaptive voltage scaling power supply for use in a digital processing component and method of operating the same, U.S. Patent 6,548,991.
43. D. Maksimovic, R. Erickson, "Universal-Input Rectifiers with High-Power-Factor Boost Doublers," U.S. Patent 5,383,109.
44. D. Maksimovic, R. Erickson, Y. Jang, "Nonlinear-Carrier Controllers for High-Power-Factor Rectifiers," U.S. patent No. 5,867,379.

SELECTED PRESENTATIONS AND PROFESSIONAL SEMINARS:

- Advances in Power Electronics Enabled by Converter Architectures, Soft Switching Techniques, and Wide Bandgap Semiconductors, invited keynote at CPES/PES conference, September 2, 2020.
- PELS Podcast - A Fireside Chat with Dragan Maksimovic, <https://ieeetv.ieee.org/ieeetv-specials/pels-podcast-03-a-fireside-chat-with-dragan-maksimovic>
- Power Electronics: Fundamentals, Impact, Directions, invited seminar at ETH Zurich, January 28-29, 2020.
- Advances in Power Electronics Enabled by Converter Topologies, Soft Switching Techniques, and Wide Bandgap Semiconductors, invited seminar at the University of Washington Clean Energy Institute, February 7, 2019
- High Frequency Power Electronics using GaN Devices, invited keynote presentation, EE 2017, Novi Sad, Serbia, October 2017.
- Advanced in Switched-Mode Power Converters Enabled by Converter Topologies, Soft Switching Techniques, and Wide Bandgap Semiconductors, invited Grainger Seminar, University of Illinois, Urbana-Champaign.
- High-Efficiency, High-Density Power Electronics for xEV Applications, SELECT seminar, August 16, 2017.
- Power Electronics for Electric-Drivetrain Vehicles, invited 5-day seminar at IIT Kharagpur, India, December 12-16, 2016.
- Advances in Switched-Mode Power Converters Enabled by Wide Bandgap Semiconductors, Soft Switching Techniques, and Converter Topologies, invited PELS Distinguished Lecturer presentation, IIT Kharagpur, India, December 13, 2016.
- 100 MHz GaN Power Conversion, invited keynote presentation at IEEE CIPS 2016, Nuremberg, Germany, 3/10/2016.
- Monolithic High Frequency GaN Switched-Mode Power Converters, invited PELS Distinguished Lecturer presentation, UC Berkeley, Feb.1, 2016.
- Advances in Switched-Mode Power Converters Enabled by Wide Bandgap Semiconductors, invited PELS Distinguished Lecturer presentation, University of Pittsburgh, PA, Jan.27, 2016.
- Monolithic Very High Frequency GaN Switched-Mode Power Converters, invited presentation at IEEE CICC 2015, 9/25/2015
- Monolithic Very High Frequency GaN Switched-Mode Power Converters, invited presentation at Fraunhofer Institute, Freiburg, Germany, 6/2/2015.

- Modeling and Control of Switched-Mode Power Converters, invited short course sponsored by the Gordon Foundation, Tel-Aviv University, May 25-28, 2015.
- GaN-based High-Frequency Integrated Switched-Mode Power Converters, invited presentation at GOMAC Tech 2015, 3/26/2015 (slides co-authored by Z.Popovic, Y.Zhang, D.Sardin)
- A Disruptive Approach to Electric Vehicle Power Electronics, presentation at NREL Advanced Power Electronics and Electric Motors (slides co-authored by R.W.Erickson and K.Afridi), 3/2/2015.
- Distributed Power Electronics in Photovoltaic Power Systems, invited presentation at University of Southern California, 2/19/2015.
- Very High Switching Frequency Converters using Integrated GaN Power Stages, invited presentation at National Chiao Tung University, Taiwan, 1/14/2015
- Very High Switching Frequency Converters using Integrated GaN Power Stages, invited presentation at National Tsing Hua University, 1/12/2015.
- Advances in Automotive Power Electronics, presentation given at Toyota Motor Corporation in conjunction with the final project report, 1/10/2015.
- Integration of GaN Supply Modulators and RF Power Amplifiers, invited presentation at IEEE PwrSOC 2014.
- Power Conversion Fundamentals and Technology, invited short course at IEEE CSICS 2014.
- Advances in Power Electronics for Photovoltaic Power Systems, invited seminar at CINVESTAV-IPN, Guadalajara, Mexico, January 2014.
- Integration of Supply Modulators with X-band GaN MMIC PAs, seminar at IEEE IMS 2014.
- Advances in Power Electronics for Photovoltaic Power Systems, invited seminar at University of British Columbia, Vancouver, Canada, November 2013.
- Advanced in Digital Control of Switched-Mode Power Converters, invited plenary session talk at Chinese Power Electronics Conference, 2008.
- Digital Power Control: A Researcher's Perspective, invited plenary session talk at IEEE APEC 2007
- Digital Control in SMPS, CoPEC Short Summer Course, 2006 (with R.Zane)
- Digital Control of DC-DC Converters, invited short course at the Polytechnic University of Catalonia, July 2006
- Digital Control of high-frequency SMPS, seminar presented at IEEE APEC 2006
- Digital Control in SMPS, CoPEC Short Summer Course, 2005 (with R.Zane)

- Seminar “System-Level and IC Implementation Techniques for Power Management in Battery-Powered Portable Electronics,” Mead course in Power Management, March 2005.
- Invited Seminar “Digital Control of Switched-Mode Power Converters,” Toshiba, Japan, May 2004.
- Seminar “System-Level and IC Implementation Techniques for Power Management in Battery-Powered Portable Electronics,” Mead course in Power Management, March 2004.
- Tutorial seminar “Digital control of high-frequency switching power converters,” IEEE Applied Power Electronics Conference, February 2004., with A. Prodic and R. Zane.
- R. Erickson, D. Maksimovic, and R. Zane, “Advancing Digital Control of Switched-Mode Converters,” invited presentation in the special session on current topics in power electronics research, IEEE Applied Power Electronics Conference, February 2004.
- Invited lecture “Custom IC blocks for enabling digital control in switching power converters,” IEEE solid-state circuits society, Denver chapter, July 2003 (with R. Zane).
- Invited presentation “Digital control in switching converters,” Space power workshop, 2003, (with R. Zane).
- D. Maksimovic, R. Zane, “Scalable digital control for switching power converters,” Intel Technology Symposium, Seattle, August 2002.
- R. Zane, D. Maksimovic, “Intelligent control in power converters and systems,” DARPA workshop on integrated smart power, November 2002.
- Tutorial seminar “A primer on simulation, modeling and design of the control loops of switching regulators,” IEEE APEC 2003, with R. W. Erickson.
- Invited tutorial “Power management model and implementation of power management ICs for next generation wireless applications,” IEEE Symposium on Circuits and Systems, ISCAS'02, May 2002.
- Invited seminar on analysis, modeling and design of power factor correctors, University of Salerno, Italy, June 2000.
- Invited seminar on control of power factor correctors, IEEE Vancouver Chapter, April 2000.
- Tutorial seminar on averaged switch modeling and simulation, IEEE Power Electronics Specialists Conference, Charleston, SC, June 1999, with R. W. Erickson.
- Tutorial seminar on cross-regulation in switching power converters, IEEE Applied Power Electronics Conference, 1999, with R. W. Erickson.

- Invited seminar on synthesis and analysis of PWM and quasi-resonant switching power converters at the University of Padova, Italy, 1990.
- Invited seminar on resonant-switch power converters at the High-Frequency Power Conversion Conference, Naples, Florida, 1989.
- Invited seminar at the PCI Conference, Munich, Germany, 1989.

SERVICE AND PROFESSIONAL ACTIVITIES:

- ECEE Department
 - Director, Colorado Power Electronics Center (Co-Director with R. Erickson)
 - Chair of the ECEE Strategic Planning Committee, 2020-2022
 - Member of the ECEE Graduate Committee, 2012-2020
 - Member of the Faculty Search Committee, 2015-2016
 - Chair of the Power Search Committee, 2013
 - Chair of the Optics Search Committee, Fall 2006-Spring 2007
 - Member of the Curriculum Committee, 2003-2011
 - Chair of the ECEN3250 core course review team, Fall 2004
 - Member of the Hiring Committee, Fall2004-Spring2005
 - Chair of the ad-hoc comprehensive review committee (R.Zane), Fall 2004
 - Member of the ad-hoc comprehensive review committee (D.Filipovic), Fall 2005
- College of Engineering
 - Member of the First Level Review Committee, 2016-2017
- Professional organizations (IEEE):
 - Editor for *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2013 (foundation)-ongoing
 - Associate Editor for *IEEE Transactions on Power Electronics*, 2003-ongoing.
 - Distinguished Lecturer of the IEEE Power Electronics Society, 2012-2016
 - General Chair, Twelfth IEEE Workshop on Control and Modeling for Power Electronics (COMPEL 2010)
 - Vice-Chair for DC-DC systems, ECCE 2009, ECCE 2010, ECCE 2011
 - Co-Chair of the IEEE PELS Technical Committee on DC Power Systems, 2008-2015
 - Member of the Technical Program Committee, IEEE ECCE, 2009-yearly.
 - Member of the Technical Program Committee, IEEE Applied Power Electronics Conference, 1993-yearly
 - Member of the Technical Program Committee, IEEE Power Electronics Specialists Conference, 1993-2008.
 - Member of the Technical Program Committee, IEEE COMPEL, 1999-yearly.
 - Session Chair, IEEE Applied Power Electronics Conference, yearly
 - Session Chair, IEEE ECCE, yearly
 - Session Chair, IEEE COMPEL, yearly
 - Session Chair, IEEE Power Electronics Specialists Conference
 - Reviewer:
 - IEEE Transactions on Power Electronics
 - IEEE Journal on Selected and Emerging Topics in Power Electronics
 - IEEE Transactions on Aerospace and Electronic Systems
 - IEEE Transactions on Industrial Electronics

- IEEE Transactions on Industry Applications
 - IEEE Transactions on Circuits and Systems
 - IEEE Transactions on Solid-State Circuits
- National Science Foundation
 - Member of the Panel Proposal Review, 2017, 2020
 - Member of the NSF I/U CRC panel review, December 2005.
 - Member of the Site Visit Review Team for the NSF ERC Center for Power Electronics Systems, Seventh-Year Renewal Review, April 21-23, 2005.
 - Member of the Site Visit Review Team for the NSF ERC Center for Power Electronics Systems, Sixth-Year Renewal Review, April 21-23, 2004.