

Al-Thaddeus Avestruz, PhD

Assistant Professor, Department of Electrical Engineering and Computer Science
University of Michigan
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EDUCATION

Massachusetts Institute of Technology

Cambridge, MA

PhD Electrical Engineering and Computer Science, 2016.

Research: Energy and Power for Biomedical and Other Applications

Research Assistant, Laboratory for Electromagnetic and Electronic Systems

Thesis: Energy Management in Biomedical Applications: Wireless Power and Biosensing

EE and SM degrees. Department of Electrical Engineering and Computer Science, 2006.

Thesis: Control and Design of Multi-Use Induction Machines: Traction, Generation, and Power Conversion.

SB in Physics with Electrical Engineering (VIII-A), 1994.

American Physical Society Minorities Corporate Scholarship

The Bronx High School of Science (Graduated 1989)

Bronx, NY

Westinghouse Science Talent Search Finalist, 1989: Radio-Frequency Ion Beam Sputtering and Rapid Thermal Anneal: A Novel Fabrication Technique for High T_c Thin Films

ACADEMIC POSITIONS

University of Michigan (2016 – present)

Ann Arbor, MI

Assistant Professor: Research interests include high performance power electronics, wireless power transfer, and integrated power with complementary interests in circuits and systems for sensing, electromagnetic systems, feedback and controls, renewable energy, energy storage, automotive, biomedical, and consumer.

College of Engineering. *Dean's Advisory Council for Faculty of Color (DACFC), 2022-present.*

College of Engineering. *NEXUS Faculty Advisory Board, 2019-2023. Interim Chair: 2020*

Massachusetts Institute of Technology (2006 – 2015)

Cambridge, MA

Research Assistant: Laboratory for Electromagnetic and Electronics Systems, Research Laboratory for Electronics.

PROFESSIONAL EXPERIENCE

Unified Solar, Inc. (2014-2020)

Cambridge, MA

Board of Directors/Technology Inventor: Startup to commercialize integrated circuit solution to eliminate adverse effects of partial shading in photovoltaic systems. Worked in technical and business strategy; product and investment roadmap.

Medtronic Neuromodulation Corp. (January 2007, Summer 2007, 2008, 2011)

Minneapolis, MN

Intern: Development of methods and circuits to measure neural field potentials. Researched and designed methods, techniques, and strategies to model physiological neural circuits. Work has resulted in several journal and conference publications.

Convergence Medical Devices/Skulpt, Inc. (2009 – 2011)

Woburn, MA

Co-founder, Board of Directors: Electrical impedance myography for the measurement of neuromuscular disease progression. Co-wrote and awarded SBIR Phase I and II proposals for the NIH and NSF.

Talking Lights Corporation (June 2001 – December 2004)

Boston, MA

Senior Scientist

Principal Investigator for SBIR (Small Business Innovative Research) Contracts and Grants

Proposals Written and Approved:

Hybrid Optical Wireless Networks. Awarded Navy Phase I*Individualized Wireless Network.* Awarded Department of Education Phase I*Personalized Wireless Network.* Awarded National Science Foundation Phase I*Optical Communication On Vehicles.* Nominated for Army Phase I*Free Space Optical Network: Near-ship Low Probability of Detection Communication.* Awarded Naval Sea Systems Command Phase I.

- Integration of Talking Lights in context-based pervasive computing architectures.
- Design and implementation of media access and higher layer protocols for a self-assembling, ad-hoc network of battlefield markers using free-space optical communications.
- Designed PCMCIA card optical receiver.
- Designed optical receiver for the extraction of communication signals in high ambient light interference.
- Designed and implemented modulation methods for free space optical communications in applications that include smart mines, inter-vehicular messaging and high data rate lighting-based communications.

Teradyne Corporation

Systems Engineering and Power Group (January 2000 – July 2001)

Boston, MA

Systems Engineer*Distributed Power Systems*

- Power systems architecture design and standards.
- Power converter evaluation and specification.

System Monitor and Control Architecture—Technical Lead

- Hardware Architecture—Power Distribution, Signal Delivery, Analog Front-End, Grounding and Isolation
- Fail-Safe and Fault Tolerant Designs
- Distributed Embedded Systems
- UML Software Design
- Real Time Systems—RTOS, Bus Determinism, Latency and Task Scheduling
- CAN Bus and LON
- Protocol modeling and analysis. Physical layer design and verification (e.g. RS485 and network topology).
- Project Planning and Documentation

Thornton, Incorporated (now a division of Mettler Toledo) (February 1997 – October 1999)

Waltham, MA

Senior Design Engineer

- Architect of high-performance analog systems and power electronics.
- Designed smart sensor, calibration and measurement systems with microvolt accuracy.
- CE/UL/CSA agency approvals.
- Thermal management and testing.
- Low-noise and low-drift PC board layouts. Worked to establish board cleanliness practices and processes with manufacturing engineers.
- Designed dc-to-dc and off-line converters using flyback, half-bridge resonant, SEPIC, buck and boost topologies.

Diversified Technologies, Inc. (April 1995 – December 1996)

Bedford, MA

Project Engineer

- Designed closed-loop feedback system and electromagnetics for active magnetic shielding of 300 hp motor controller in Navy minesweepers.
- Project lead for a program to explore the various effects of high power electrical arcs in fluids using ultra-low inductance pulse power system.
- Project lead in the design and construction of a diesel engine testbed to perform tests on alternative fuels.
- Member of design team for 20 kV, 2,000 Ampere Solid-State High Power Modulator for Plasma Source Ion Implantation applications.

- Testing and optimization of digital controller and fault protection for a 100 kV, 10 MW Peak Solid-State Pulse Modulator.
- Designed and built a NIST-Traceable Optical Endpoint Calibrator with Absolute 100 ppm Constant Current Source (10A, 100W) for semiconductor manufacturing line use.
- Analysis of contamination problem in Reactive Ion Etcher semiconductor equipment manufacturer.

United Nations Development Programme (Summer 1991)

Manila, Philippines

Consultant: TOKTEN Program (Transfer of Knowledge Through Expatriate Nationals). Worked with non-government organizations (NGOs), government (Department of Science and Technology), and industry (Caltex Philippines, Shell and IBM Philippines) on grass-roots programs to encourage high school and college students to embark on careers in science and technology (S&T). Traveled to seven cities and gave talks and seminars to varied audiences: students, educators, professionals and officials. Spokesperson to the media to promote S&T programs.

IBM Thomas J. Watson Research Center (Summer 1990)

Yorktown Heights, NY

Intern: Characterized and developed ECR (electron-cyclotron-resonance) microwave ion source for processing ultra-hard carbon compounds (beta carbon nitride).

TEACHING EXPERIENCE**University of Michigan, Ann Arbor**

Assistant Professor:

Control and Modeling in Power Electronics (EECS 598-2, EECS 508). Winter 2018, 2022.

Advanced Topics in the Design of Power Electronics (EECS 598). Winter 2016, 2017, 2019.

Power Electronics (EECS 418, EECS 498). Fall 2016, 2017, 2018, 2019, 2022. Winter 2021.

Electrical Engineering Systems Design II (EECS 300): Guest Lecture on Power Management. 2019-2022.

Electronic Circuits (EECS 311). Winter 2020.

Capstone Project Course (ISD 503): Fall 2018

Integrated Systems and Design Professional Program Faculty: Hybrid and Electric Vehicles

NASA Glenn Research Center (July 2018)

University of Michigan North Campus (August 2018)

Massachusetts Institute of Technology

Teaching Assistant: Advanced Circuit Design (6.331), Power Electronics Laboratory (6.131), Microcontroller Project Laboratory (6.115). Outreach Program for Middle School Students, MIT Center for Materials Science and Engineering and the National Science Foundation.

Theses Co-SupervisedAnas Al Bastami. *Power Monitoring in Integrated Circuits*. Master of Engineering. September 2014.Elizabeth George. *Advanced Applications in Wide-Area Impedance Sensing*. Master of Engineering. February 2014.William H. Thompson. *Standalone Capacitively-Coupled Occupancy Sensor*. Master of Engineering. September 2012.Victor Sinow. *Integrated Circuit Control of Resonant and Hard Switched DC/DC Converters for Industrial and Educational Applications*. Master of Engineering. June 2009.J.J. Cooley. *Capacitive Sensing with a Fluorescent Lamp*. Master of Engineering. February 2007. Best Master of Engineering Thesis Prize in Electrical Engineering and Masterworks Best Oral Thesis Presentation.Candace Wilson. *Development of a Laboratory Course in Power Electronics Control Circuitry*. Master of Engineering. June 2006.Alex Crumlin. *Methods for Short-Circuit Identification and Location in Automobiles*. Master of Engineering. June 2006.**PATENTS**11,258,304. *Multiple Access Wireless Power Transfer*. Issued February 22, 2022.10,734,844. *Switched Receiver for Wireless Power Transfer*. Issued August 4, 2020.10,732,251. *Wireless Power Transfer Metering*. Issued August 4, 2020.

9,786,423. *Method and Apparatus for Producing an Asymmetric Magnetic Field*. Issued October 10, 2017.
 8,892,198. *Devices and Methods for Evaluating Tissue*. Issued November 18, 2014.
 8,907,664. *Non-Intrusive Monitoring of Power and Other Parameters*. Issued December 9, 2014. Continuation-in-Part.
 8,344,724. *Non-Intrusive Monitoring of Power and Other Parameters*. Issued January 1, 2013.
 8,886,053. *Multi-Frequency Dual-Use System*. Issued November 11, 2014. Continuation-in-Part.
 8,150,268. *Multi-Frequency Dual-Use System*. Issued April 3, 2012.
 7,923,936. *Fluorescent Lamp with Integral Proximity Sensor for Building Energy Management*. Issued April 12, 2011.
 7,016,115. *Communication with Non-Flickering Illumination*. Issued March 21, 2006.
 App. 17/497680, *Power Processing and Energy Storage*, October 2021.
 App. 17/348644, *Segmented Wireless Power Transfer*, June 2021.
 App. 17/348705, *Cycle-by-Cycle Digital Control of DC-DC Converters*, June 2021.
 App. 17/348645, *Foreign Object Detection in Wireless Power Transfer*, June 2021.
 App. 17/348692, *Multiple Port DC-DC Converter*, June 2021.
 App. 17/335838, *Feedback-Based Transistor Driver*, June 2021.
 App. 17/348,705, *Very Fast Power Converter Architectures*, June 2021.
 App. 17/198978, *Wireless Power Transfer in Modular Systems*, March 2021.
 PCT App. PCT/US2019/033277, *Power Transfer System*. May 2019.
 App. 14/549,959, *Photovoltaic Power Balancing and Differential Power Processing*, November 2014.

PROFESSIONAL MEMBERSHIPS

IEEE Senior Member. IEEE Power Electronics Society (PELS). IEEE Control Systems Society. IEEE Circuits and Systems Society. IEEE Industrial Electronics Society. Power Sources Manufacturers Association (PSMA). Society of Hispanic Professional Engineers (SHPE).

PROFESSIONAL SERVICE

Past Elected Chair of the IEEE TC1: Technical Committee for the Control and Modeling of Power Electronics, IEEE Power Electronics Society. January 2021 – December 31, 2022.

Chair, IEEE Modeling and Control Technical Achievement Award Committee. March 2021 – May 2022.

General Chair, IEEE Twenty-Fourth IEEE Workshop on Control and Modeling for Power Electronics. IEEE COMPEL 2023 at the University of Michigan, April 2020 – present.

Associate Editor, IEEE Open Journal of Power Electronics. Oct. 2019 – present.

Local Chair. 2022 IEEE Energy Conversion Congress and Exposition (ECCE). Detroit, MI.

Technical Program Co-Chair. 2021 Wireless Power Week. San Diego, CA.

Local Chair. 2020 IEEE Energy Conversion Congress and Exposition (ECCE). Detroit, MI.

Guest Associate Editor. IEEE Journal of Emerging and Selected Topics in Power Electronics: Special Issue on Topologies, Modeling Methodologies, and Control Techniques for High-Frequency Power Conversion. 2019.

Associate Technical Program Chair. 2019 IEEE Energy Conversion Congress and Exposition (ECCE). Baltimore, MD. Sept. 29 – Oct. 3, 2019.

Technical Program Committee. 2019 IEEE Wireless Power Week, June 2019, London.

Voting Member. US National Work Group on Measuring Systems for Electric Vehicle Fueling and Submetering. Sponsored by NIST. March 2019 – present.

IEEE Power Electronics Society Member of Technical Committees: TC1—Power and Core Technologies; TC2—Power Conversion Systems and Components; TC6—High Performance and Emerging Technologies. 2016 – present.

Technical Program Topic Chair. 2018 IEEE Energy Conversion Congress and Exposition (ECCE). September 23-28, 2018. Portland, OR.

Technical Session Chair. 2018 IEEE Energy Conversion Congress and Exposition (ECCE). September 23-28, 2018. Portland, OR.

Technical Session Chair. 2017 IEEE Energy Conversion Congress and Exposition (ECCE). October 1-5, 2017. Cincinnati, OH.

Technical Program Committee. 18th IEEE Workshop on the Control and Modeling for Power Electronics. July 9-12, 2017. Stanford, CA.

Department of Energy Sunshot PVRD2 Merit Review Lead Reviewer. 2017. Washington D.C.

National Science Foundation Proposal Reviewer Panel. 2017. Washington D.C.

Invited Panelist. NSF Workshop on Directions in Power Electronics Research. November 2016. Washington D.C.

Invited Department of Energy SunShot PV Modules and Systems Strategy Forum. September 2016. Las Vegas, NV.

Department of Energy Sunshot Concept Paper Reviewer.

Technical Committee Member. IEEE Workshop on Wide Bandgap Power Devices and Applications. Nov. 2016. Fayetteville, AK.

Technical Session Chair. IEEE Workshop on Wide Bandgap Power Devices and Applications. Nov. 2016. Fayetteville, AK.

Technical Session Chair. 2016 IEEE Energy Conversion Congress & Exposition. Milwaukee, WI.

Technical Session Chair. 2016 IEEE Applied Power Electronics Conference and Exposition (APEC). Long Beach, CA.

Reviewer for the IEEE Transactions of Power Electronics, IEEE Transactions on Biomedical Circuits and Systems, IEEE Transactions of Microwave Theory and Techniques, IEEE Journal of Solid-State Circuits, IEEE Transactions on Industrial Electronics, IEEE Journal of Photovoltaics, IEEE Transactions on Vehicle Electrification, IEEE Applied Power Electronics Conference (APEC), IEEE Energy Conversion Congress (ECCE), IEEE Power Electronics Specialists Conference.

IEEE 1451.4 Standards Committee—Smart Sensors and Mixed-Signal Interface (February – October 1999).

AWARDS

2022 NSF CAREER: Optimizing Power Processing for Heterogeneous Energy Storage Systems.

2019 IEEE PELS Best ECCE Paper on Emerging Technology Award in the category of oral papers. “Performance Comparisons of Synchronous and Uncontrolled Rectifiers for 27.12 MHz Wireless Power Transfer Using CMCD Converters.”

2018 NASA iTech Energy Finalist for Photovoltaic Cell-Level Power Balancing Using Intrinsic Energy Storage for High-Efficiency, High-Reliability Solar Power.

2017 Best Poster in the Workshop on Microsystems Technologies and Applications for the Internet of Things at the University of Michigan.

2014 APEC Conference Session Award. 2002 R&D 100 Award. 1989-1991 American Physical Society Minorities Corporate Scholarship. 1989 Westinghouse Science Talent Search Finalist.

STUDENT AWARDS

2022 NSF Graduate Research Fellowship (Austin Lin).

2022-2023 UM Rackham Predoctoral Fellowship (Alireza Ramyar). *Power Processing Architectures for Sustainable Power and Energy*.

2021 IEEE Power Electronics Society PhD Thesis Talk Award (Sung Yul Chu). *Sparse Electromagnetic Measurement to Recover High Fidelity Information for Wireless Power Transfer*.

2021-2022 UM Rackham Predoctoral Fellowship (Xin Zan). *Scalable Architectures for High Frequency and Very High Frequency Wireless Power Transfer*.

2021 University of Michigan Towner Prize for Distinguished Academic Achievement (Xiaofan Cui).

2018 IEEE Energy Conversion Congress and Exposition (ECCE) Student Demonstration 2nd Place (Xin Zan et al.). *27.12 MHz Real-Time Smart-Controlled Bi-Directional Wireless Power Transfer with Current-Mode Class D Converters*. September 23-28, 2018. Portland, OR.

University of Michigan Graduate Symposium Best Visualization Award – Xin Zan, 2018.

2018 IEEE PELS Workshop on Wireless Power Student Award (Xin Zan). *27.12 MHz Bi-Directional Wireless Power Transfer Using Current-Mode Class D Converters with Phase-Shift Power Modulation*.

University of Michigan Graduate Symposium First Prize in Power – Sung Yul Chu, 2017.

INVITED SEMINARS

Massachusetts Institute of Technology. Shattering Pre-Conceptions in Power Electronics. November 29, 2021.

University of Idaho. EE Research Colloquium. Design of High-Speed Digital Control of Variable-Frequency Power Converters. Dec. 10, 2020.

Penn State University. Research to Action: The Science of Drawdown. *Multiple Access Wireless Power and Communications for Sensors Everywhere*. Sept. 16-18, 2019.

University of Illinois at Urbana-Champaign, Department of Electrical and Computer Engineering. Power and Energy Systems Seminar. *Wireless Power Transfer: Energy Anytime and Anywhere*. October 22, 2018.

GRANTS

2022 NSF CAREER: Optimizing Power Processing for Heterogeneous Energy Storage Systems.

Michigan Translational Research & Commercialization (MTRAC), Power Processing Architecture for Heterogeneous Second-Use Battery Energy Storage Systems. 8/31/2021 – 8/31/2022

US Department of Energy. Grant No. 1387-1674. Research and Development of Architectures for Photovoltaic Cell-Level Power Balancing Using Diffusion Charge Redistribution. 9/1/2016 – 8/31/2021.

National Science Foundation. Planning Grant: Engineering Research Center for Comprehensive Energy Storage Solutions in Electrified Transportation (CESSET). 9/2018 – 8/2019.

National Science Foundation. EAGER: Combined Innovative Methods in Immersion Cooling for High Density Power Electronics. 9/2019 – 2/2022.

ARPA-E. Resonant Solid-State Circuit Breakers Based on Wireless Coupling in MVDC Systems. 7/2019 – 7/2021.

PERSONAL

US Citizen.

PUBLICATIONS

Journal Articles

1. X. Cui, **A.-T. Avestruz**, *Fast-Response Variable Frequency DC-DC Converters Using Cycle Event-Switching Digital Control*. Accepted to IEEE Transactions of Power Electronics, March 2023.
2. X. Cui and **A.-T. Avestruz**, "Large-Signal Stability Guarantees for Cycle-by-Cycle Controlled DC-DC Converters," in IEEE Control Systems Letters, vol. 7, pp. 763-768, 2023, doi: 10.1109/LCSYS.2022.3225586.
3. R. Kheirollahi, S. Zhao, X. Zan, H. Zhang, X. Lu, J. Wang, **A.-T. Avestruz**, F. Lu, "Fast Y-Type Thyristor-Based DC SSCB Using Complementary Commutation in a Capacitor-Capacitor Pair Structure," in IEEE Transactions on Power Electronics, vol. 38, no. 1, pp. 1144-1154, Jan. 2023, doi: 10.1109/TPEL.2022.3202125.
4. X. Zan and **A.-T. Avestruz**, "Field Cancellation for Circuits Encircled by VHF Wireless Power Transfer Coils," in IEEE Transactions on Power Electronics, vol. 38, no. 1, pp. 46-52, Jan. 2023, doi: 10.1109/TPEL.2022.3200682.
5. X. Zan, D. Roman, R. Kheirollahi, X. Lu, S. Zheng, F. Lu, **A.-T. Avestruz**, *Medium Voltage Accurate Pulse Power Generator for Accurate Current Interruption*, in IEEE Transactions on Industrial Electronics, vol. 70, no. 4, pp. 3604-3615, April 2023, doi: 10.1109/TIE.2022.3174234.
6. Xiaofan Cui, Alireza Ramyar, Peyman Mohtat, Veronica Contreras, Jason B. Siegel, Anna G. Stefanopoulou, **Al-Thaddeus Avestruz**, "Lite-Sparse Hierarchical Partial Power Processing for Second-Use Battery Energy Storage Systems," in IEEE Access, vol. 10, pp. 90761-90777, 2022, doi: 10.1109/ACCESS.2022.3201132.
7. Xiaofan Cui, Alireza Ramyar, Jason B. Siegel, Peyman Mohtat, Anna G. Stefanopoulou, **Al-Thaddeus Avestruz**, *Comparing power processing system approaches in second-use battery energy buffering for electric vehicle charging*, Journal of Energy Storage, Volume 49, 2022, 104017, ISSN 2352-152X, <https://doi.org/10.1016/j.est.2022.104017>.
8. R. Kheirollahi, S. Zhao, Y. Wang, H. Zhang, X. Zan, S. Zheng, X. Lu, J. Wang, **A.-T. Avestruz**, F. Lu, "High-Frequency High Step-Up Inductive Power Transfer-Based Capacitor Charger in Active Injection DC Circuit Breakers," in IEEE Journal of Emerging and Selected Topics in Industrial Electronics, 2022, doi: 10.1109/JESTIE.2022.3156013.
9. X. Zan and **A.-T. Avestruz**, "100 MHz Symmetric Current-Mode Class D Wireless Power Transfer," in IEEE Journal of Emerging and Selected Topics in Power Electronics, 2022, doi: 10.1109/JESTPE.2022.3148973.
10. S. Y. Chu, X. Cui, X. Zan and **A.-T. Avestruz**, "Transfer-Power Measurement Using a Non-Contact Method for Fair and Accurate Metering of Wireless Power Transfer in Electric Vehicles," in IEEE Transactions on Power Electronics, vol. 37, no. 2, pp. 1244-1271, Feb. 2022, doi: 10.1109/TPEL.2021.3105689.
11. S. Y. Chu, X. Zan and **A.-T. Avestruz**, "Electromagnetic Model-Based Foreign Object Detection for Wireless Power Transfer," in IEEE Transactions on Power Electronics, vol. 37, no. 1, pp. 100-113, Jan. 2022, doi: 10.1109/TPEL.2021.3100420.
12. R. Kheirollahi, X. Zan, S. Zhao, H. Zhang, S. Zheng, X. Lu, **A.-T. Avestruz**, F. Lu, "Capacitive Couple-based Transient Current Commutation in Solid-State Circuit Breakers," in IEEE Transactions on Power Electronics, doi: 10.1109/TPEL.2021.3134461.
13. S. Zhao, Z. Dongye, Y. Wang, H. Zhang, S. Zheng, X. Lu, **A.-T. Avestruz**, F. Lu, "A 4 kV, 120 A SiC Solid-State DC Circuit Breaker Powered By a Load-Independent IPT System," in IEEE Transactions on Industry Applications, vol. 58, no. 1, pp. 1115-1125, Jan.-Feb. 2022, doi: 10.1109/TIA.2021.3084130.
14. A. Sarin and **A.-T. Avestruz**, "A Framework for Code Division Multiple Access Wireless Power Transfer," in IEEE Access, vol. 9, pp. 135079-135101, 2021, doi: 10.1109/ACCESS.2021.3116114.
15. A. Ramyar and **A.-T. Avestruz**, "Reconfigurable Photovoltaic Emulator for Differential Diffusion Charge Redistribution Solar Modules," in IEEE Open Journal of Industry Applications, vol. 2, pp. 36-46, 2021, doi: 10.1109/OJIA.2021.3063842.
16. A. Sarin and **A. Avestruz**, "Code Division Multiple Access Wireless Power Transfer for Energy Sharing in Heterogenous Robot Swarms," in IEEE Access, vol. 8, pp. 132121-132133, 2020, doi: 10.1109/ACCESS.2020.3010202.
17. X. Zan and **A. Avestruz**, "Isolated Ultrafast Gate Driver with Variable Duty Cycle for Pulse and VHF Power Electronics," in IEEE Transactions on Power Electronics, doi: 10.1109/TPEL.2020.2999481.
18. P. Lindahl, **A. T. Avestruz**, W. Thompson, E. George, B. R. Sennett, S. B. Leeb, "A Transmitter-Receiver System for Long-Range Capacitive Sensing Applications," in IEEE Transactions on Instrumentation and Measurement, vol. 65, no. 10, pp. 2412-2423, 2016.
19. A.H. Chang, **A. Avestruz**, S.B. Leeb, J.L. Kirtley, *Analysis and Design of DC System Protection Using Z-Source Circuit Breaker*. IEEE Transactions on Power Electronics, Vol. 31, Issue 2, 2016.
20. A.H. Chang, **A. Avestruz**, S.B. Leeb, *Capacitor-Less Photovoltaic Cell-Level Power Balancing Using Diffusion Charge Redistribution*. IEEE Transactions on Power Electronics, Vol. 30, Issue 2, 2014.
21. S. Stanslaski, P. Afshar, P. Cong, J. Giftakis, P. Stypukowski, D. Carlson, D. Linde, D. Ullestad, **A. Avestruz**, T. Denison, *Design and validation of Fully Implantable, Chronic, Closed-loop Neural Stimulator with Concurrent Sensing and Stimulation Capability*. IEEE Transactions on Neural Systems and Rehabilitation Engineering, Vol. 2, No. 4, 2012.
22. **A. Avestruz**, J.J. Cooley, D. Vickery, J. Paris, S.B. Leeb, *Dimmable Solid State Ballast with Integral Capacitive Occupancy Sensor*, IEEE Transactions on Industrial Electronics, Vol. 59, Issue 4, 2011.
23. J.J. Cooley, **A. Avestruz**, S.B. Leeb, *A Retrofit Capacitive Sensing and Occupancy Detection System using Fluorescent Lamps*. IEEE Transactions on Industrial Electronics, Vol. 59, Issue 4, 2011.
24. J.J. Cooley, **A. Avestruz**, S.B. Leeb, *Small-signal analysis of fully-differential closed-loop op-amp circuits with arbitrary external impedance elements*, Circuits, Devices, and Systems, IET, Vol. 5, Issue 5, 2011, pp. 371-383.
25. W. Wichakool, **A. Avestruz**, R. Cox, S.B. Leeb, *Modeling and Estimating Current Harmonics of Variable Electronic Loads*. IEEE Transactions on Power Electronics, 2009, pp. 2803-2811, Vol. 24, Iss. 12.
26. T. Denison, K. Consoer, W. Santa, **A. Avestruz**, J. Cooley, and A. Kelly, *A 2 μ W 100 nV/rHz Chopper-Stabilized Instrumentation Amplifier for Chronic Measurement of Neural Field Potentials*. Solid-State Circuits, IEEE Journal of, vol. 42, 2007, pp. 2934-2945.
27. P. Cuddihy, R.T. Hinman, **A. Avestruz**, et al. *Successful Aging*. Pervasive Computing, IEEE, Vol.3, No. 2. pp. 48-50. April-June 2004.

28. R.T. Hinman, E.C. Lupton, S.B. Leeb, **A. -T. Avestruz**, R. Gilmore, D. Paul, N. Peterson. *Using talking lights illumination-based communication networks to enhance word comprehension by people who are deaf or hard of hearing*. American Journal of Audiology. Vol.12, No.1, pp. 17-22. June 2003.

Refereed Conference Papers

1. V. Contreras, X. Cui, W. Xu, **A.-T. Avestruz**, *Switching-Synchronized Sampled-State Space for High Speed Digital Control of a Variable Frequency Multiphase Buck Converter*. Accepted to 2022 IEEE 23rd Workshop on Control and Modeling of Power Electronics, COMPEL 2022, June 20-23, Tel-Aviv, Israel.
2. W. Xu*, X. Cui, A. Ramyar, J. Siegel, A. Stefanopoulou, **A.-T. Avestruz**, *Lite-Sparse Hierarchical Partial Power Processing for Heterogeneous Degradation of Batteries in Energy Storage Systems*. Accepted to 2022 IEEE Energy Conversion Congress and Exposition, Detroit, MI, Oct. 9-13, 2022.
3. R. Kheirollahi, X. Zan, Y. Wang, H. Zhang, X. Lu, **A.-T. Avestruz**, F. Lu, *Trade-Off Between Cost and Efficiency in Solid-State Circuit Breakers*. Accepted to 2022 IEEE Energy Conversion Congress and Exposition, Detroit, MI, Oct. 9-13, 2022.
4. A. Ramyar, Y. Altheyabi and **A.-T. Avestruz**, "Reliable Method for the Measurement of Diffusion Capacitance in Solar Photovoltaic Cells," 2021 IEEE Energy Conversion Congress and Exposition (ECCE), 2021, pp. 576-582, doi: 10.1109/ECCE47101.2021.9595437.
5. J. Rademacher*, X. Zan and **A. Avestruz**, "High Power, High Efficiency Wireless Power Transfer at 27.12 MHz Using CMCD Converters," 2021 IEEE Energy Conversion Congress and Exposition (ECCE), 2021, pp. 5698-5703, doi: 10.1109/ECCE47101.2021.9594951.
6. X. Cui, C. Deng and **A. -T. Avestruz**, "A Fast Response DC-DC Converter with Programmable Ripple for Combined Distributed Computation and Communication," 2021 IEEE Applied Power Electronics Conference and Exposition (APEC), 2021, pp. 468-473, doi: 10.1109/APEC42165.2021.9487391.
7. Cui, X., Ramyar, A., Siegel, J., Mohtat, P., Stefanopoulou, A. and **Avestruz, A.T.**, 2021. "Grid Interfaces to Electric Vehicle Chargers Using Statistically-Structured Power Conversion for Second-Use Batteries as Energy Buffering," arXiv e-prints, pp.arXiv-2104.
8. X. Zan and **A. Avestruz**, "100 MHz Wireless Power Transfer for Lightweight UAVs and Agile Robots," 2020 IEEE Applied Power Electronics Conference and Exposition (APEC), New Orleans, LA, USA, 2020, pp. 1655-1661, doi: 10.1109/APEC39645.2020.9124492.
9. A. Sarin, D. Abbot, S. Revzen and **A. Avestruz**, "Bidirectional Capacitive Wireless Power Transfer for Energy Balancing in Modular Robots," 2020 IEEE Applied Power Electronics Conference and Exposition (APEC), New Orleans, LA, USA, 2020, pp. 852-859, doi: 10.1109/APEC39645.2020.9124139.
10. S.Y. Chu, A. Sarin, H. Hofmann, **A.T. Avestruz**. "Charge Up!: Wireless Power Transfer Game for High School Students," *American Society for Engineering Education, 2020 Annual Conference and Exposition*. June 21-24, 2020.
11. A. Sarin, D. Abbot, S. Revzen, **A.T. Avestruz**. Bidirectional Capacitive Wireless Power Transfer for Energy Balancing in Modular Robots. *IEEE 2020 Applied Power Electronics Conference (APEC)*, March 15-19, 2020. New Orleans, LA.
12. X. Cui, C. Keller and **A. Avestruz**, "Cycle-by-Cycle Digital Control of a Multi-Megahertz Variable-Frequency Boost Converter for Automatic Power Control of LiDAR," 2019 IEEE Energy Conversion Congress and Exposition (ECCE), Baltimore, MD, USA, 2019, pp. 702-711.
13. X. Zan, Z. Guo* and **A. Avestruz**, "Inductive Wireless Power Transfer at 100 MHz with Wide Load Range and Constant Output Current," 2019 IEEE Energy Conversion Congress and Exposition (ECCE), Baltimore, MD, USA, 2019, pp. 4967-4975.
14. L. Yang, X. Cui, **A. Avestruz** and N. Ozay, "Correct-by-construction control synthesis for buck converters with event-triggered state measurement," 2019 American Control Conference (ACC), Philadelphia, PA, USA, 2019, pp. 1056-1063. **[Invited]**
15. X. Cui and **A. Avestruz**, "Switching-Synchronized Sampled-State Space Modeling and Digital Controller for a Constant Off-Time, Current-Mode Boost Converter," 2019 American Control Conference (ACC), Philadelphia, PA, USA, 2019, pp. 626-633.
16. S. Y. Chu and **A. Avestruz**, "A New Calibration Strategy for Transfer-Power Measurement of Wireless Charging of Electric Vehicles," 2019 IEEE Transportation Electrification Conference and Expo (ITEC), Detroit, MI, USA, 2019, pp. 1-5.
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