

Yue Cao

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EDUCATION

Ph.D. – Electrical Engineering Concentration – Power and Energy Systems University of Illinois, Urbana-Champaign, IL, US MS/PhD Adviser: Prof. Philip T. Krein	2013 - 2017
M.S. (thesis) – Electrical Engineering Concentration – Power and Energy Systems University of Illinois, Urbana-Champaign, IL, US	2011 - 2013
B.S. (honors) – Electrical Engineering Second Major – Mathematics University of Tennessee, Knoxville, TN, US Adviser: Prof. Leon M. Tolbert	2007 - 2011
High School Diploma West High School, Knoxville, TN, US	grad. 2007

RESEARCH INTERESTS

Power electronics, motor drives, energy storage, power systems, modeling, control
Transportation electrification, eVTOL UAVs, electric aircraft, heavy-duty trucks, locomotives, charging stations
Microgrids/nanogrids, energy efficient buildings, grid-tied renewables (esp. hydrokinetic, wave, solar)
Machine learning enabled design automation and optimization, electric-thermal integrated systems

ACADEMIA EXPERIENCE

Assistant Professor, <i>Oregon State University</i> , Corvallis, OR <ul style="list-style-type: none">• Tenure-track, Energy Systems Group, Electrical Engineering and Computer Science• For project listings, please refer to Funding and Publication sections below• Additional project info available at http://web.engr.oregonstate.edu/~caoy2/currentresearch.html	Aug. 2018-present
Graduate Research Assistant, Prof. Philip Krein, <i>Univ. of Illinois</i> <ul style="list-style-type: none">• Industry/Agency project (Rolls-Royce, NSF POETS Center): Mitigating power systems variability in more electric aircraft utilizing power electronics implemented dynamic thermal storage• Agency project (NSF POETS Center): Energy efficient buildings utilizing power electronics, HVAC drives, and solar-electrical-thermal energy exchange and storage• Industry project (Rolls-Royce): Complete electrical, thermal, mechanical, hydraulic power systems co-design for Boeing 737 and Boeing 787 more electric aircraft• Foundation project (Grainger): Electrical battery model for use in dynamic electric vehicle simulations• Foundation project (Grainger): Modular switched capacitor DC-DC converters tied with batteries for EV drivetrains• Collaborative project: Wireless and catenary power transfer systems for EV range extension on rural highways• Collaborative project: 5 kHz solar data implications for energy loss via maximum power point trackers• Industry project (Ingersoll Rand/Thermo King): Hybrid power systems and motor drives for use in mobile/transportation refrigeration applications	2011-2017 (0.5 FTE)
Graduate Teaching Assistant, Department of ECE, <i>Univ. of Illinois</i> <ul style="list-style-type: none">• Leading ECE 431 (Electric Machinery) and ECE 469 (Power Electronics) labs, 4 semesters• Lecturing relevant theories (1 hr weekly), organizing experiments (5 hr weekly), grading reports• Head TA (Fall 2014), refining/designing lab procedure, re-editing lab manual to new version• Formal training at UIUC Graduate Academy for College Teaching	2013-2015 (0.5 FTE)

- Research Assistant Intern, **Oak Ridge National Laboratory**, Oak Ridge, TN Summer 2010
- Modeling and simulation of grid-tied PV inverters using SiC devices
 - DC-AC inverter, real time PV tracking, PWM control, SiC devices, MPPT, solar energy
 - MATLAB/Simulink/PLECS, device loss modeling, R-tools, Excel
- Undergrad. Research Assistant, Prof. Leon Tolbert of Elect. Engr., **Univ. of Tenn.** 2008-2011 (0.25 FTE)
- Design, modeling, and testing of multilevel DC-AC inverter interface with solar panels
 - Design and building of “BugEV” electric vehicle and hybrid fuel-cell/electric vehicle
 - Li-ion battery/BMS, DC motor/controller, H₂ fuel cell, mechanical vehicle construction, team project
- Tutor, Math Tutorial Center, Department of Mathematics, **Univ. of Tenn.** 2008-2011 (0.25 FTE)
- Tutoring for all 100-level and 200-level math courses to all majors

INDUSTRY EXPERIENCE

- Research Scientist – Propulsion Systems, **Amazon Prime Air**, Seattle, WA 2017-2018
- Power electronic system design of next generation product delivery unmanned aerial vehicles
 - Multi-disciplinary system modeling and optimization, fault-tolerant motor drive
- Consultant-in-training, **McKinsey & Company: Insight Program**, Chicago, IL June 2016
- Among 30 selected finalists (out of 500) for a week of training and insight of management consulting
- Power Electronics Engineer Intern, **Apple Inc.–Special Projects**, Cupertino, CA Jan.-July 2015
- Hardware EE R&D (high voltage applications)
 - Architecture & converter design, electromechanical tests, board design, lab management, vendor discussion
- Power Electronics Engineer Intern, **Halliburton Company**, Houston, TX Summer 2014
- R&D for downhole oil/gas drilling motor drives under harsh environment
 - Complete AC motor drive design, simulation, prototype; SiC MOSFET/gate driver design, model, testing
 - Top 10 interns’ presentation
- Power Electronics Engineer Intern, **Flanders Electric**, Evansville, IN Summer 2012
- R&D for a multilevel converter based medium voltage industrial (mining/metal) AC motor drive
 - Multilevel DC-AC inverter, IGBT, PWM control, marketing aspects, design and simulation, tech. report
 - Topology design and device selection, trade-off matrix analysis, machines and drives tests
- Power Systems Engr. Intern, **Memphis Light Gas & Water (MLGW) – Utility**, Memphis, TN Summer 2009
- Design and planning of residential distribution power line conversion from 23 kV to 46 kV
 - Field training, Excel, Auto CAD, SCADA, mapping, construction planning

TEACHING RECORDS (*COVID-19 remote learning)

Course (at OSU)	Quarter	Enrollment	Course as a whole (out of 6)	Instructor’s contribution (out of 6)
ECE 431/531 (pow. elec.)	F 22	49	5.8	5.8
ECE 599 (adv. pow. elec.)	S 22	27	5.8	5.8
ECE 438/538 (elec. vehicle)	W 22	50	5.5	5.7
ECE 431/531 (pow. elec.)	F 21	64	5.9	5.9
ECE 535 (motor drives)	S 21*	20	5.7	5.5
ECE 438/538 (elec. vehicle)	W 21*	55	5.7	5.8
ECE 431/531 (pow. elec.)	F 20*	55	5.4	5.6
ECE 599 (adv. pow. elec.)	S 20*	8	5.9	5.9
ECE 438/538 (elec. vehicle)	W 20	25	5.9	5.9
ECE 431/531 (pow. elec.)	F 19	16	5.9	5.9
ECE 431/531 (pow. elec.)	S 19	42	5.6	5.6
ECE 438/538 (elec. vehicle)	W 19	25	5.5	5.5
ECE 499/599 (adv. pow. elec.)	F 18	8	5.3	5.7

Course (at UIUC as TA)	Semester	Enrollment	Overall teaching effectiveness (out of 5)	Overall course quality (out of 5)
ECE 469 (power electronics lab)	F 15	16	4.3	4.6
ECE 469 (power electronics lab)	F 14	15	4.1	4.2
ECE 431 (electric machines lab)	S 14	15	4.5	4.6
ECE 431 (electric machines lab)	S 13	14	4.6	4.4

COURSE DEVELOPMENT

ECE 431/531: Introduction to Power Electronics (first offered in Spring 2019)

ECE 431/531: Power Electronics Laboratory (first offered in Fall 2021)

ECE 438/538: Electric Vehicles (first offered in Winter 2019)

ECE 539 (was experimental 599): Advanced Power Electronics (first offered in Fall 2018)

ECE 535: Adjustable Speed Drives (first offered in Spring 2021)

CURRENT STUDENTS (as adviser)

^{URM} Under-represented minority * Co-advised student

Name	Duration	Degree	Notable Achievement
Derek Jackson	09/19 – 06/24	MS/PhD	BS/MS from OSU, Internship at Daimler Trucks and NREL, ECCE student award, ITEC student award, ARPA-E SUMMIT fellow
Md. Tariquzzaman	09/21 – 06/25	PhD	MS from KUET, Bangladesh
Inyong Kim*	01/22 – 12/24	PhD	BS from Korea, MS from OSU
Peidong Li	09/22 – 12/26	PhD	BS from Wuhan University, China
Sam Barton	09/22 – 06/26	PhD	BS from OSU
Vinson Guov	01/21 – 06/23	MS	BS from OSU, Internship at Microchip
Trevor Murphy ^{URM}	01/22 – 12/23	MS	BS from OSU, Internship at Collins Aero
Saad Shaikh	09/21 – 06/23	MS	BS from College of Engineering Pune, India

GRADUATED STUDENTS (as adviser)

^{URM} Under-represented minority * Co-advised student ^ Visiting/exchange student + Student from UIUC

Name	Duration	Degree	Graduation Plan & Notable Achievement
Alastair Thurlbeck	09/18 – 09/22	PhD	Research Engineer at DOE National Renewable Energy Lab (NREL Denver), BS/MS from Univ. of Glassgow, UK, Internship at Amazon Prime Air (twice, Seattle), ITEC student award
Niraja Swaminathan ^{URM}	11/19 – 06/21	PostDoc	Senior Postdoc at UIUC with Dr. Kiruba Haran, PhD from IIT-Madras
Trenton Kilgore	09/20 – 03/22	MS	Electrical Engineer at Daimler Trucks (Portland), BS from OSU, Internship at Microchip (Bend), IEEE PES Scholarship
Derek Jackson	09/19 – 06/21	MS	Continuing PhD at OSU, BS from OSU, Internship at Daimler Trucks and Blount International (Portland), ECCE student award
Kyle Gulan*	09/17 – 06/19	MS	Powertrain engineer at John Deere (Iowa)
Sebastian Tengvall^	03/19 – 06/19	MS	Hardware engineer at Rovsing A/S in Denmark
Bailey Sauter	06/20 – 06/21	BS	PhD at CU-Boulder with Dr. Dragan Maksimovic, Internship at Tektronix (Portland)
Trenton Kilgore	01/19 – 06/20	BS	Continuing MS at OSU, IEEE PES Scholarship
Bradford Kearbey+	08/15 – 05/17	BS	Power engineer at Burns & McDonnell (Chicago)
Andrew Smith+	08/15 – 05/17	BS	Continuing MS at UIUC
Jeffrey Weinberg+	08/15 – 05/16	BS	Power electronics engineer at Delphi (Indiana)
Thomas Navidi+	03/14 – 05/16	BS	PhD student at Stanford University

THESIS COMMITTEE (non-adviser)

Name	Duration	Degree	Major Adviser
David Glennon	08/20 –	PhD	T. Brekken
Jesse Harris	09/19 –	PhD	T. Brekken
Michael Boller	04/20 –	PhD	E. Cotilla-Sanchez/T. Brekken
Chris Dizon	04/20 –	PhD	T. Brekken
Daniel Gaebele	04/19 – 06/21	PhD	M. Magana
Yunfan Li	09/17 – 06/21	PhD	L. Chen
Ali Haider	01/19 – 09/21	PhD	T. Brekken
Leila Ghorban	01/19 – 06/20	PhD	T. Brekken
Yousef Qassim	09/19 – 12/19	PhD	M. Magana
Aashish Adhikari	09/19 – 06/21	MS	L. Chen
Yang Qian	09/19 – 12/19	MS	H. Liu
Samantha Holman	01/19 – 06/19	BS	T. Brekken

AWARDS & HONORS (international and national)

Senior Member, IEEE, 2022

Junior Fellow, US National Academy of Engineering (NAE) Frontier of Engineering (FOE) Class of 2022

Keynote Speaker, IEEE International Future Energy Challenge (IFEC), 2022

NSF CAREER Award (ENG-ECCS-EPCN), National Science Foundation, 2022

Highlighted Webinar (newsletter), IEEE Transportation Electrification Community, 2020

Highlighted Paper (newsletter), IEEE Transactions on Transportation Electrification, 2017

Golden Reviewer, IEEE Journal of Photovoltaics Editorial Board, 2017

IEEE ECCE Conf. Student Travel Award (60 people), IEEE Power Electronics Society, Sept. 2015

IEEE IEMDC Conf. Student Travel Award (30 people), IEEE PES/PELS/IAS/IES, May 2013

National Honorable Mention (top 20 teams), US EPA P3 Student Design Competition for Sustainability, Apr. 2011

IEEE Myron Zucker Student Award (5 people), IEEE Industry Applications Society, Sept. 2010

National 18th Place (out of 500 nation wide), Virginia Tech Regional Mathematical Competition, Oct. 2009

USAMO Finalist (twice, 250 finalists out of 100,000 nation wide), USA Mathematics Olympiad, 2006 & 2007

AWARDS & HONORS (state and university)

Learning Innovation Grant for Transformative Education, Oregon State Univ., Feb. 2020

Sundaram Seshu Graduate Fellowship, Dept. of ECE, Univ. of Illinois, Apr. 2015

Excellent Teaching Assistant (twice), Univ. of Illinois, Spring 2013 & Spring 2014

James M. Henderson Graduate Fellowship, Dept. of ECE, Univ. of Illinois, Apr. 2012

Multiple University/College/Dept. Merit Scholarships (totaling 2/3 out-state tuitions), Univ. of Tenn., 2007-11

Graduation Student Speaker (10 min. talk), Chancellor's Honors Graduation Ceremony, Univ. of Tenn., May 2011

Extraordinary Academic Achievement (4 engr. students), Chancellor's Honors Citation, Univ. of Tenn., Apr. 2011

Extraordinary Professional Promise (14 engr. students), Chancellor's Honors Citation, Univ. of Tenn., Apr. 2011

Project Winner (3 engineering winners), UT Undergraduate Research Competition, Apr. 2009

College Math Champion, Allen Medal All Freshmen Mathematics Competition, Univ. of Tenn., Apr. 2008

College Essay Winner (10 winners univ. wide), Life of the Mind All Freshmen Essay Competition, Sept. 2008

State Champion (twice, out of 800 state wide), UT Pro2Serve[®] Tennessee Math Contest, 2005 and 2006

Additional scholarships at undergraduate level:

Callie Wood Ross Scholarship, UT Tennessee Math Contest 4-year Scholarship, 2007-2011

Herbert G. and Lillian C. Duggan Scholarship, College of Engineering, 2007-2011

Carol and Malcolm Bayless Scholarship, Department of Electrical Engineering, 2008-2011

Lucille and Herbert Lee Scholarship, Department of Mathematics, 2008-2011

J. P. & Gladys Maples Scholarship, Department of Mathematics, 2010-2011

Cooper D. Schmitt Scholarship, Department of Mathematics, 2009-2010

Regal Award in Recognition of Outstanding Academic Achievement, 2007-2008

ADVISED STUDENT AWARDS

Derek Jackson: DOE ARPA-E SUMMIT Student Fellow, March 2023
Derek Jackson: IEEE ITEC Conf. Travel Award (10 students out of 40+ apps), June 2022
Derek Jackson: IEEE ECCE Conf. Travel Award (15 students out of 100+ apps), Oct. 2020
Trenton Kilgore: IEEE PES (Power & Energy Society) Scholarship (nationally competitive), Sept. 2019
Alastair Thurlbeck: IEEE ITEC Conf. Travel Award (12 students out of 40 apps), June 2019
Brad Kearbey: Illinois Grainger Scholar (top graduate), May 2017
Brad Kearbey: IEEE PES Scholarship (main reference), Aug. 2016
Jeff Weinberg: NREL-National Renewable Energy Lab Summer Fellowship (main reference), May 2016
Thomas Navidi: Illinois Grainger Scholar (top graduate), May 2016

SERVICES & LEADERSHIP (off-campus)

Vice Chair, IEEE PELS TC11 - Aerospace Power, 2023-present
Special Sessions Chair, Organizing Committee, IEEE ECCE Conference, 2022
Tutorials Chair, Organizing Committee, IEEE ECCE Conference, 2021
Board Member and Award Chair, IEEE PELS TC11 - Aerospace Power, 2020-2022
Active Member, IEEE PELS TC10 - Design Methodologies, 2020-present
Active Member, IEEE IAS Transportation Systems Committee, 2019-present
Panel Organizer (Blue Economy: wave/hydrokinetic energy), IEEE ECCE Conference, 2021
Session Chair (energy storage), Technical Program Committee, IEEE APEC Conference, 2021
Session/Track Chair (energy storage), Technical Program Committee, IEEE ICDCM Conference, 2021
Panel Organizer (eVTOL UAV), IEEE ECCE Conference, 2020
Session/Track Chair (ML/AI for power electronics), Technical Program Committee, IEEE ECCE Conf., 2020
Session/Track Chair (wireless power transfer), IEEE ECCE Conference, 2019
Panel Organizer and Chair (aviation propulsion), IEEE ITEC Conference, 2019
Industry and Tutorials Co-chair, Organizing Committee, IEEE ECCE Conference, 2018
Session Chair (motor drives), IEEE APEC Conference, 2017
Corresponding Technical Programs Chair, Organizing Committee, IEEE PECTI Conference, 2016
University Relations Chair, Organizing Committee, IEEE PECTI Conference, 2013
Webmaster (3 times), 2009, 2010 & 2012 IEEE ECCE Conference, 2009-2012

SERVICES & LEADERSHIP (on-campus)

Founding Faculty Adviser, IEEE Joint PES/PELS OSU Chapter (Power Energy/Electronics Society), 2020-present
Undergrad Research Committee Member, School of EECS, OSU, 2019-present
Search Advocate for Diversity, Equity, and Inclusion, OSU, Summer 2021
Search Committee Member, Instructor/Sr. Instructor/Project Instructor, School of EECS, OSU, 2019
President, IEEE-PES/PELS Student Chapter, Univ. of Illinois, 2012-2013
Treasurer and Recruitment Chair, Executive Board, Theta Tau Professional Engineering Fraternity, 2010-2011
Team Captain, US EPA P3 Student Design Competition for Sustainability, Univ. of Tenn., 2009-2011
Participant (20 selected university wide), Eastman[®] Undergraduate Leadership Development Program, 2010

EDITORSHIP & REVIEW

Associate Editor, IEEE Transactions on Industry Applications (TIA), 2021-present
Associate Editor, IEEE Transactions on Transportation Electrification (TTE), 2018-present
Guest Editorial Board, Special Issue on More Electric Aircraft Technologies, IEEE TTE, 2021-2022
Associate Editor, UT Undergraduate Research Journal, 2009-2010

Book Review:

J. G. Hayes and G. A. Goodarzi. *Electric Powertrain: Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles*. Hoboken, NJ: Wiley, 2018, pp. 3-108, 161-177, 249-298, 392-440.

Invited Federal Grant Review:

NSF Energy, Power, Control, and Networks (EPCN), Regular proposal panel, April 2022
DOE Building Technology Office (BTO), SBIR proposal (ad hoc), Jun. 2021
DOE Water Power Technology Office (WPTO), TEAMER Facilities proposal (ad hoc), Sept. 2020
NSF Industrial Innovation Partnerships (IIP), SBIR Power & Energy proposal (ad hoc), May 2020
DOE Solar Energy Technology Office (SETO), Systems Integration proposal panel, \$18M/6 awards, Sept. 2019
NSF Industrial Innovation Partnerships (IIP), SBIR Power & Energy proposal panel, Aug. 2019

Invited Foreign or State Grant Review:

Canada MITACS, University-Industry Partnership Center (ad hoc), Aug. 2022
Canada MITACS, University-Industry Partnership Center (ad hoc), Aug. 2020
North Carolina Space Grant, Faculty Seed Project (ad hoc), May 2020
Canada MITACS, University-Industry Partnership Center (ad hoc), Mar. 2020

Invited Journal Review:

IEEE Trans. Transportation Electrification
IEEE Trans. Industrial Electronics
IEEE Trans. Power Electronics
IEEE Journal of Emerging and Selected Topics in Power Electronics
IEEE Trans. Smart Grid
IEEE Trans. Sustainable Energy
IEEE Trans. Vehicular Technology
IEEE Journal of Photovoltaics
IEEE Trans. Industry Applications
IEEE Trans. Control Systems Technology
IEEE Industrial Electronics Magazine
IEEE Trans. Aerospace and Electronic Systems
IEEE Access
IET Journal Electric Systems Transportation
MDPI Applied Sciences

MEMBERSHIPS

Senior Member, IEEE, 2022-present
Institute of Electrical and Electronics Engineers (IEEE), 2009-present
IEEE PELS (Power Electronics Society), 2010-present
IEEE IAS (Industry Applications Society), 2018-present
IEEE PES (Power and Energy Society), 2013-2017
UT/UIUC Club Tennis, 2009-2017
Theta Tau Professional Engineering Fraternity, 2009-2011
Pi Mu Epsilon National Honors Society, 2008-2011
UT Chancellor's Honors Program, 2007-2011
Canada/USA Mathcamp Alumni, Mathematics Foundation of America, 2007-present

SKILLS & HOBBIES

Computer: MATLAB/Simulink, PLECS, SPICE, ANSYS/Maxwell, C/C++, Cadence/Eagle, Python

Engineering: FE/EIT License, DC/DC, DC/AC, AC/DC Converters, IGBT/SiC/GaN MOSFET, High Voltage, High Power, Battery, Energy Storage, AC Motors and Drives (esp. PMSM), Gate Drives, Magnetic Design, Schematics and PCB Layout, Microcontroller, HIL

Language: English (fluent), Chinese-Mandarin (native)

Musical Instrument: Accordion, Certificate of Professional (grade 7/10), Chinese Musicians' Association

Athletics: Tennis (NTRP 4.0), Snowboard (◆◆)

Travel: 14 countries and 50 US states

COURSES TAKEN

Engineering: (Advanced) Power Electronics, Electric Machines, Motor Drives, Power Systems Analysis, Power Systems Dynamics, Power Systems Operation and Control, Frequency/State-space Control, Digital Control, Analog IC Design, Embedded Systems, Numerical Circuits, Heat Transfer

Math: Advanced Calculus, Advanced Linear Algebra, Real Analysis, Probability and Stochastic Process, Convex Optimization, Numerical Analysis, Partial Differential Equation

Business: Engineering Management, Engineering Finance, Decision Analysis, Business Ethics, Entrepreneurship

JOURNAL ARTICLES (*advised student as first author)

- [J17-IP] M. Tariquzzaman*, S. Barton, P. Li, **Y. Cao**, "Multi-physics Modeling of Hydrokinetic Turbine Energy Conversion System," *IEEE JESTPE*, under submission.
- [J16-IP] D. Jackson*, **Y. Cao**, "A Universal Modeling Framework for Hybrid Real and Virtual Energy Storage Systems," *IEEE Transactions on Energy Conversion*, under submission.
- [J15] S. Zhao, **Y. Cao**, F. Lu, et al., "Soft Turn-Off DC Solid-State Circuit Breakers with Flexible Dual Tripping Schemes," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 99, 2024
- [J14-IP] T. Kilgore*, **Y. Cao**, A. Thurlbeck, T. Brekken, E. Cotilla-Sanchez, P. T. Krein, "A Modern Power Electronics Instructional Circuit Board Using Si and SiC Devices," *IEEE Open Journal of Power Electronics*, under submission.
- [J13] F. Guo, Y. Zhao, P. Wheeler, **Y. Cao**, "Hybrid Active PWM Strategy with Dual-Mode Modulation Waves of Three-Level T-type Converter for Aircraft Turboelectric Propulsion Systems," *IEEE Transactions on Industry Applications*, vol. 99, pp. 1-11, 2023.
- [J12] A. Thurlbeck* and **Y. Cao**, "An Online Peak Shaving Controller for Optimized Power-electronic Converter Lifetimes in Turbine Array Generation Systems," *IEEE Transactions on Energy Conversion*, vol. 38, no. 2, pp. 1325-1337, 2023.
- [J11] Y. Wang, H. Zhang, **Y. Cao**, F. Lu, "Remaining Opportunities in Capacitive Power Transfer Based on Inductive Power Transfer Duality," *IEEE Transactions on Transportation Electrification*, vol. 9, no. 2, pp. 2902-2915, 2023.
- [J10] M. Fard, J. He, H. Huang, **Y. Cao**, "Aircraft Distributed Electric Propulsion Technologies - A Review," *IEEE Transactions on Transportation Electrification*, vol. 8, no. 4, pp. 4067-4090, 2022. **(Review article, consistently ranked top 10 downloads of all TTE papers)**
- [J9] A. Thurlbeck* and **Y. Cao**, "A Mission Profile Based Reliability Modeling Framework for Fault-tolerant Electric Propulsion," *IEEE Transactions on Industry Applications*, vol. 58, no. 2, pp. 2312-2323, 2022.
- [J8] D. Jackson*, S. Belakaria, **Y. Cao**, J. Doppa, X. Lu, "Machine Learning Enabled Design Automation and Multi-Objective Optimization for Electric Transportation Power Systems," *IEEE Transactions on Transportation Electrification*, vol. 8, no. 1, pp. 1467-1481, 2022.
- [J7] N. Swaminathan*, N. Lakshminarasamma, and **Y. Cao**, "A Fixed Zone Perturb and Observe MPPT Technique for Standalone Distributed PV System," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 10, no. 1, pp. 361-374, 2022.
- [J6] C. Zhu, **Y. Cao**, H. Zhang, F. Lu, and X. Zhang, "Comprehensive Design and Optimization of an Onboard Resonant Self-Heater for EV Battery," *IEEE Transactions on Transportation Electrification*, vol. 7, no. 2 pp. 452- 463, 2021.
- [J5] N. Swaminathan* and **Y. Cao**, "An Overview of High-Conversion High-Voltage DC-DC Converters for Electrified Aviation Power Distribution System," *IEEE Transactions on Transportation Electrification*, vol. 6, no. 4, pp. 1740-1754, 2020. **(Review article, consistently ranked top 20 downloads of all TTE papers for 2 years)**
- [J4] **Y. Cao**, J. A. Magerko, T. Navidi, and P. T. Krein, "Power electronics implementation of dynamic thermal inertia to offset stochastic solar resources in low-energy buildings," *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 4, no. 4, pp. 1430-1441, 2016. **(Direct accept without revision)**

- [J3] **Y. Cao**, R. C. Kroeze, and P. T. Krein, "Multi-timescale parametric electrical battery model for use in dynamic electric vehicle simulations," *IEEE Transactions on Transportation Electrification*, vol. 2, no. 4, pp. 432-442, 2016. **(Consistently ranked top 50 downloads of all TTE papers for 3 years)**
- [J2] F. Filho, **Y. Cao**, L. M. Tolbert, and B. Ozpineci, "Real-time selective harmonic minimization for multilevel inverters connected to solar panels using artificial neural network angle generation," *IEEE Transactions on Industry Applications*, vol. 47, no. 5, pp. 2117-2124, 2011.
- [J1] **Y. Cao**, "Multilevel DC-AC converter interface with solar panels," *PURSUIT The Journal of Undergraduate Research at the University of Tennessee*, vol.1, no.1, pp. 83-88, 2010.

BOOK CHAPTERS

- [B1] X. Lu and **Y. Cao**, "Dynamic Microgrids for Grid Resiliency Enhancement: Modeling, Control, and Implementation," in *Power Grid Resilience – Springer Power Electronics and Power Systems Series*, New York: Springer, 2023, pp. 1-27, accepted and in press. (digital copy available upon request)

CONFERENCE PROCEEDINGS (*advised student as first author)

- [C43] D. Jackson*, **Y. Cao**, "Aggregating Real and Virtual Energy Storage Systems Using a Universal Modeling Framework," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2023
- [C42] M. Tariquzzaman*, S. Barton, P. Li, **Y. Cao**, "Multi-physics Modeling of Hydrokinetic Turbine Energy Conversion System," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2023
- [C41] P. Li*, **Y. Cao**, "Fault-Tolerance MPPT Design and Analysis for Hydrokinetic Turbine Systems," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2023
- [C40] T. Murphy*, **Y. Cao**, B. Polagye, T. Dillon, B. Robertson, E. Amon, "Techno-Economic-Based Design of a DC Nanogrid Using a Wave Energy Converter," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2023.
- [C39] M. S. Shaikh*, **Y. Cao**, "Traction Inverter Reliability Analysis for e-Truck," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2023.
- [C38] I. Kim*, T. Brekken, B. Johnson, **Y. Cao**, et al., "Equivalent circuit modeling of a Wave Energy Converter via Eigenmode analysis," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2023.
- [C37] A. Thurlbeck*, **Y. Cao**, "Machine Learning based Condition Monitoring for SiC MOSFETs in Hydrokinetic Turbine Systems," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2022.
- [C36] T. Kilgore*, M. Tariquzzaman, **Y. Cao**, "Thermal Management of SiC MOSFETs within Hydrokinetic Applications," in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2022.
- [C35] D. Jackson*, **Y. Cao**, I. Beil, "Bi-Level Optimization Framework for Heavy-Duty Electric Truck Charging Station Design," in *Proc. IEEE Transportation Electrification Conf. (ITEC)*, 2022.
- [C34] V. Guov*, **Y. Cao**, I. Beil, "Islanding of a Topologically Realistic Rural Grid Using Grid-Forming Inverters," in *Proc. IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, 2022.
- [C33] V. Guov*, D. Jackson, **Y. Cao**, "Sizing BESS and On-site Renewable for Battery-electric Freight Rail Charging Station," in *Proc. IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, 2022.
- [C32] D. Jackson*, C. Dizon, M. S. Shaikh, **Y. Cao**, T. Brekken, A. Edwards "Mitigating Peak-to-Average Power Variability in Wave Energy Converter Systems: A Design Comparison," in *Proc. IEEE International Symposium on Power Electronics for Distributed Generation Systems (PEDG)*, 2022.
- [C31] T. A. Shifat*, X. Tu, **Y. Cao**, A. Schultz, "New design of marine controlled-source electromagnetic transmitter using supercapacitors," in *Proc. International Meeting for. Applied Geoscience & Energy (IMAGE)*, 2022.
- [C30] O. Bilgen, R. Wang, **Y. Cao**, N. Erol, X. Shan, "A Reconfigurable Ducted Turbine Array Concept for Renewable Flow Energy Harvesting," in *Proc. AIAA Science and Technology Forum and Exposition (AIAA SciTech)*, 2022.
- [C29] A. Thurlbeck*, D. Jackson, V. Guov, **Y. Cao**, "Exploring Improvement in PMSM Drive Performance and

- Reliability Enabled by Futuristic Power Electronics,” in *Proc. IEEE International Symposium on Diagnostics for Electrical Machines Power Electronics and Drives (SDEMPED)*, 2021, pp. 1-7.
- [C28] N. Swaminathan*, B. Sauter, **Y. Cao**, “Control Architectures of Solar-Powered HVAC Systems: A DC-DC Converter’s Perspective,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2021, pp. 1-6.
- [C27] R. Cao*, D. K. Hu, **Y. Cao**, “Practical Compensation Strategy for Accurate Torque Control in Mass-Produced High-speed Traction IPM E-Drives,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2021, pp. 1-7.
- [C26] J. G. Hayes, **Y. Cao**, X.M. Yuan, J. L. Suda, X.F. Yang, J. Friebe, O. Ogashawara, J. P. Renie, and G. A. Goodarzi, “Global perspectives on electric vehicles education: Part I,” in *Proc. Engineering Education for Sustainable Development (EESD)*, Cork, Ireland, 2021, pp. 1-8. **(Education paper)**
- [C25] J. G. Hayes, **Y. Cao**, X.M. Yuan, J. L. Suda, X.F. Yang, J. Friebe, O. Ogashawara, J. P. Renie, and G. A. Goodarzi, “Global perspectives on electric vehicles education: Part II,” in *Proc. Engineering Education for Sustainable Development (EESD)*, Cork, Ireland, 2021, pp. 1-8. **(Education paper)**
- [C24] N. Swaminathan*, N. Lakshminarasamma, and **Y. Cao**, “DCM and CCM operation of buck-boost full-bridge DC-DC converter,” in *Proc. IEEE Applied Power Electronics Conference (APEC)*, 2021, pp. 1-6.
- [C23] D. Jackson*, S. Belakaria, **Y. Cao**, J. Doppa, X. Lu, “Machine Learning Enabled Fast Multi-Objective Optimization for Electrified Aviation Power System Design,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2020, pp. 6385-6390. **(student travel award)**
- [C22] A. Thurlbeck* and **Y. Cao**, “Fully Integrated Fault-tolerance for PMSMs in Aviation Applications,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2020, pp. 4916-4922.
- [C21] A. S. Haider, T. Brekken, **Y. Cao**, “FACTS-based Grid Interface Design with Embedded Energy Storage for Ocean Wave Power,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2020, pp. 3079-3083.
- [C20] D. Sun, X. Lu, L. Du, and **Y. Cao**, “Optimal Design of PV Systems Considering Levelized Cost of Energy and Power Density,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2020, pp. 1708-1714.
- [C19] Y. Men, L. Ding, Y. Du, X. Lu, D. Zhao, **Y. Cao**, “Holistic Small-Signal Modeling and AI-Assisted Region-Based Stability Analysis of Autonomous AC and DC Microgrids,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2020, pp. 6162-6169. **(student travel award)**
- [C18] T. Kilgore*, A. Thurlbeck, **Y. Cao**, T. Brekken, C.S. Li, P. Krein, “PowerBox: A Modern Power Electronics Education Toolbox Using Si and SiC Devices,” in *Proc. IEEE Applied Power Electronics Conference (APEC)*, 2020, pp. 2594-2600. **(Education paper)**
- [C17] **Y. Cao**, J. A. Magerko, R. Serna, S. Qin, R. Pilawa-Podgurski, and P. T. Krein, “One-year submillisecond fast-dynamic solar database: collection, investigation, and application,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2019, pp. 2047-2053. **(Open-source database)**
- [C16] **Y. Cao** and A. Thurlbeck, “Heavy-duty UAV Electric Propulsion Architectures and Multi-timescale Multi-physics Modeling,” in *Proc. AIAA/IEEE Electric Aircraft Technologies Symposium (EATS)*, 2019, pp. 1-13.
- [C15] K. Gulan*, E. Cotilla-Sanchez, and **Y. Cao**, “Charging analysis of ground support vehicles in an electrified airport,” in *Proc. IEEE Transportation Electrification Conf. (ITEC)*, 2019, pp. 1-6.
- [C14] A. Thurlbeck* and **Y. Cao**, “Analysis and modeling of UAV power system architectures,” in *Proc. IEEE Transportation Electrification Conf. (ITEC)*, 2019, pp. 1-8. **(student travel award)**
- [C13] **Y. Cao**, K. Davis, and S. A. Zonouz, “A framework of smart and secure power electronics driven HVAC thermal inertia in distributed power systems,” in *Proc. IEEE GreenTech of Smart City*, 2018, pp. 127-132.
- [C12] **Y. Cao**, M. A. Williams, P. T. Krein, and A. G. Alleyne, “Mitigating power systems variability in more electric aircraft utilizing power electronics implemented dynamic thermal storage,” in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2017, pp. 1412-1418.
- [C11] **Y. Cao**, M. A. Williams, B. J. Kearbey, A. T. Smith, P. T. Krein, and A. G. Alleyne, “20x-Real Time Modeling and Simulation of More Electric Aircraft Thermally Integrated Electrical Power Systems,” in *Proc. IEEE International Conf. Electrical Systems for Aircraft, Railway, Ship Propulsion and Road Vehicles (ESARS-ITEC)*, 2016, pp. 1-6.

- [C10] T. Navidi*, **Y. Cao**, and P. T. Krein, “Analysis of wireless and catenary power transfer systems for EV range extension on rural highways,” in *Proc. IEEE Power and Energy Conf. at Illinois (PECI)*, 2016, pp. 1-6.
- [C9] J. A. Magerko, **Y. Cao**, and P. T. Krein, “Quantifying photovoltaic fluctuation with 5 kHz data: implications for energy loss via maximum power point trackers,” in *Proc. IEEE Power and Energy Conference at Illinois (PECI)*, 2016, pp. 1-7.
- [C8] **Y. Cao**, J. A. Magerko, T. Navidi, and P. T. Krein, “Dynamic energy management needs in low-energy buildings imposed by stochastic solar resources,” in *Proc. IEEE International Conf. Complex Systems Engineering (ICCSE)*, 2015, pp. 1-6. **(Invited paper)**
- [C7] **Y. Cao**, Y. Lei, R.C.N. Pilawa-Podgurski, and P. T. Krein, “Modular switched-capacitor dc-dc converters tied with lithium-ion batteries for use in battery electric vehicles,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2015, pp. 85-90. **(student travel award)**
- [C6] **Y. Cao**, J. A. Magerko, T. Navidi, and P. T. Krein, “Dynamic filtering stochastic solar resources using HVAC drive control - A determination of feasible bandwidth,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2015, pp. 3127-3134. **(student travel award)**
- [C5] **Y. Cao** and Z. Ye, “Simulation and analysis of switched capacitor dc-dc converters for use in battery electric vehicles,” in *Proc. IEEE Power and Energy Conference at Illinois (PECI)*, 2015, pp. 1-6.
- [C4] **Y. Cao** and P. T. Krein, “An average modeling approach for mobile refrigeration hybrid power systems with improved battery simulation,” in *Proc. IEEE Transportation Electrification Conf. (ITEC)*, 2013, pp. 1-6.
- [C3] **Y. Cao** and P. T. Krein, “Average and detailed modeling approaches emphasizing subsystems in a hybrid mobile refrigeration,” in *Proc. IEEE International Electric Machines and Drives Conf. (IEMDC)*, 2013, pp. 1132-1136. **(student travel award)**
- [C2] F. Filho, L. M. Tolbert, **Y. Cao**, and B. Ozpineci, “Real-time selective harmonic minimization for multilevel inverters connected to solar panels using artificial neural network angle generation,” in *Proc. IEEE Energy Conversion Congress and Expo (ECCE)*, 2010, pp. 594-598.
- [C1] F. Filho, **Y. Cao**, and L. M. Tolbert, “11-level cascaded H-bridge grid-tied inverter interface with solar panels,” in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, 2010, pp. 968-972.

DATASETS

- [D1] **Y. Cao**, J. A. Magerko, R. Serna, S. Qin, R. Pilawa-Podgurski, and P. T. Krein, “One-year submillisecond fast-dynamic solar database,” *IEEE DataPort*, 266.3 GB, 2019, DOI:10.21227/5s8f-ha92 **(Open-source database)**

PATENTS

- [IP1] **Y. Cao**, J. Traube, and L. Pingree, (title currently undisclosed), initial disclosure filed in 2018 with Amazon Prime Air.

THESIS/REPORTS (authored or *advised)

- [T10] S. Shaikh*, “Optimizing Performance and Reliability of Electric Trucks (E-Trucks) through Field Oriented Control and Reliability Analysis,” *MS Thesis*, Oregon State University, 2023.
- [T9] A. Thurlbeck*, “Reliability Orientated Deployment of Power-Electronic Converters: Techniques for Reliability Modeling, Condition Monitoring, and Lifetime Optimization,” *PhD Dissertation*, Oregon State University, 2022.
- [T8] T. Kilgore*, “Power Semiconductor Loss Modeling & Heat Sink Design for Submerged Power Electronics Within Hydrokinetic Applications,” *MS Thesis*, Oregon State University, 2022.
- [T7] D. Jackson*, “Multi-Objective Power Electronics System Design and Optimization, A Machine Learning Approach,” *MS Thesis*, Oregon State University, 2021.
- [T6] K. Gulan*, “Charging Analysis of Ground Support Vehicles in an Electrified Airport,” *MS Thesis*, Oregon

State University, 2019.

- [T5] S. Tengvall*, “Automated Selection and Design of DC-DC Switch Mode Power Supplies with MatLab,” *MS Project Report*, Oregon State University, 2019.
- [T4] **Y. Cao**, “Power electronics implementation of dynamic thermal storage as effective inertia in large energy systems,” *PhD Dissertation*, University of Illinois, 2017.
- [T3] **Y. Cao**, “An average modeling approach of hybrid power systems for use in mobile refrigeration applications,” *MS Thesis*, University of Illinois, 2013.
- [T2] T. Ansink, M. Atchley, V. Browning, **Y. Cao**, and M. Everett, “Sustainability Analysis of Personal Transportation for Near Urban Commuting,” *BS Honors Thesis*, University of Tennessee, 2011.
- [T1] **Y. Cao**, J. Coplon, E. Ng, and M. Pickelsimer, “Battery Electric Vehicle and Hybrid Fuel-cell/Battery Electric Vehicle for EPA P3 2011 Competition,” *BS Honors Thesis*, University of Tennessee, 2011.

PRESENTATIONS (unpublished)

- [P36-40] **Y. Cao**, “Future Energy Challenge in Power Electronics Enabled Systems of Systems,” *University of Michigan Ann Arbor, Ohio State University, Purdue University, UC Berkeley, University of Washington*, Spring 2023. **(Invited speaker)**
- [P35] E. Cotilla-Sanchez and **Y. Cao**, “Resilience and Sustainability in Power Systems and Power Electronics,” *OSU College of Engineering Lecture Series*, Corvallis, May 2023. **(Invited speaker)**
- [P34] **Y. Cao**, “OSU-Daimler DOE Supertruck Collaboration,” *OSU College of Engineering Deans Leadership Meeting*, Corvallis, Mar. 2023. **(Invited speaker)**
- [P33] **Y. Cao**, “Power Electronics Enabled Systems of Systems: Co-design of efficiency, power density, and reliability,” *US National Academy of Engineering (NAE) Frontier of Engineering (FOE) Symposium*, Bled, Slovenia, Oct. 2022. **(Invited speaker)**
- [P32] **Y. Cao**, “Electric Drivetrain in Hydrokinetic Current Energy,” *DOE ARPA-E Ocean Week*, Washington DC, Oct. 2022. **(Invited panelist)**
- [P31] A. Barajas-Ritchie, D. Jackson*, E. Cotilla-Sanchez, **Y. Cao**, “Marine Energy Modeling for Power Flow Studies,” *US DOE Secretary, US Senator, Oregon Governor Onsite Visit*, Corvallis, OR, Aug. 2022.
- [P30] **Y. Cao**, “Future Energy Challenge in Power Electronics Enabled Systems of Systems,” *IEEE International Future Energy Challenge*, Knoxville, TN, July 2022. **(Invited 1-hour keynote)**
- [P29] **Y. Cao**, “OSU Power Electronics Research,” *Oak Ridge National Lab – Daimler Trucks Supertruck Kickoff*, Oak Ridge, TN, July 2022.
- [P28] **Y. Cao**, “NAVFAC Visit at OSU,” *Naval Facilities Program Manager Onsite Visit*, Corvallis, OR, June 2022.
- [P27] G. List, **Y. Cao**, et al., “MULTI-DECADAL DECARBONIZATION PATHWAYS FOR U.S. FREIGHT RAIL Achieving Sustainable Train Energy Pathways (A-STEP),” *DOE ARPA-E Summit*, Denver, CO, May 2022.
- [P26] J. Sun, **Y. Cao**, et al., “RAFT: Reconfigurable Array of High-Efficiency Ducted Turbines for Hydrokinetic Energy Harvesting,” *DOE ARPA-E Summit*, Denver, CO, May 2022.
- [P25] **Y. Cao**, J. Sun, T. Brekken, “Booming the Blue Economy: A New Era for Wave and Hydrokinetic Energy,” *IEEE Energy Conversion Congress and Expo (ECCE), Special Sessions*, Vancouver, BC, Oct. 2021. **(Panel organizer)**
- [P24] **Y. Cao**, “RAFT: Reconfigurable Array of High-Efficiency Ducted Turbines for Hydrokinetic Energy Harvesting,” *Pacific Marine Energy Center (PMEC) Annual Meeting*, virtual, Sept. 2021.
- [P23] J. Sun, **Y. Cao**, et al., “RAFT: Reconfigurable Array of High-Efficiency Ducted Turbines for Hydrokinetic Energy Harvesting,” *DOE ARPA-E Summit*, virtual, May 2021.
- [P22] **Y. Cao**, J. Doppa, “Machine Learning Enabled Design Automation and Optimization for Electric Transportation Power Systems,” *IEEE Power Electronics Society (PELS) Webinar*, virtual, Apr. 2021. **(Society-wide invited webinar, 200+ attendance)**
- [P21] **Y. Cao**, “Heavy-duty all-electric urban aerial vehicles,” *IEEE Energy Conversion Congress and Expo (ECCE), Special Sessions*, Detroit, MI, Oct. 2020. **(Panel organizer)**

- [P20] **Y. Cao**, “All-electric Propulsion for Heavy-duty Urban Aerial Vehicles,” *IEEE Power Electronics Society (PELS) Transportation Electrification Community (TEC) Webinar*, virtual, Aug. 2020. **(Society-wide invited webinar, 400+ attendance)**
- [P19] **Y. Cao**, “Heavy-Duty UAV Propulsion Systems,” *FAA-Oregon State UAS ASSURE Center*, Corvallis, OR, Mar. 2020. **(Invited speaker)**
- [P18] **Y. Cao**, “Electrified Aviation – System Perspectives and Emerging UAV’s,” *IEEE Transportation Electrification Conf. (ITEC), Panel - Aviation Electric Propulsion Systems*, Detroit, MI, June 2019. **(Panel organizer)**
- [P17] **Y. Cao**, “Thermal Inertia – Beyond the Conventional Role of Motor Drives in Distributed Power Systems,” *IEEE Power and Energy Society General Meeting (PES GM)*, Portland, OR, Aug. 2018. **(Invited panelist)**
- [P16] **Y. Cao**, “Towards Next Generation Electric Aircraft – Power Electronic Based Multi-Physics Power System Design,” *IEEE PELS & AESS Meeting – Seattle Chapter*, Seattle, WA, May 2018. **(Invited speaker)**
- [P11-15] **Y. Cao**, “Power Electronics Enabled Next Generation Systems of Systems,” *University of Arkansas, Oregon State University, University of Central Florida, Washington State University, George Washington University*, Spring 2017. **(Invited speaker)**
- [P10] **Y. Cao**, “Power Electronics Based Systems – Current Applications and Future Directions,” *Silk Road International Forum of Young Scholars*, Xi’an, Dec. 2016.
- [P9] **Y. Cao** and P. T. Krein, “Power Electronics Implementation of Dynamic Thermal Inertia to Mitigate Source and Load Variability in Large Energy Systems,” *NSF Power Optimization of Electro-Thermal Systems (POETS) Annual Meeting*, Stanford University, Oct. 2016.
- [P8] J. Weinberg*, **Y. Cao**, and P. T. Krein, “Complete Electrical Battery Model for Transportation Electrification Applications,” *IEEE Power and Energy Conference at Illinois (PECI)*, Feb. 2016.
- [P7] A. Smith*, B. Kearbey*, **Y. Cao**, and P. T. Krein, “Modeling and Simulation for More-Electric Aircraft: A Comprehensive MATLAB/Simulink Toolbox,” *IEEE Power & Energy Conf. at Illinois (PECI)*, Feb. 2016.
- [P6] **Y. Cao** and P. T. Krein, “An Average Modeling Approach of Hybrid Power Systems for Use in Mobile Refrigeration Applications,” *NSF Power Optimization of Electro-Thermal Systems (POETS) Workshop*, University of Illinois, Oct. 2015.
- [P5] **Y. Cao**, J. A. Magerko, T. Navidi, and P. T. Krein, “Low-Energy Buildings Dynamic Energy Management Using HVAC Control Coordinated with Stochastic Solar Resources,” *NSF Power Optimization of Electro-Thermal Systems (POETS) Workshop*, University of Illinois, Oct. 2015.
- [P4] C. Mak, S. Sridharan, **Y. Cao**, and P. T. Krein, “Fault Modeling and Simulation for More-Electric Aircraft Systems,” *NSF Power Optimization of Electro-Thermal Systems (POETS) Workshop*, Univ. of Illinois, Oct. 2015.
- [P3] **Y. Cao** and P. T. Krein, “Energy Storage = A Building?” *Joint Center for Energy Storage Research (JCESR) Symposium*, Champaign, IL, Oct. 2014.
- [P2] **Y. Cao**, F. Filho, L. M. Tolbert, “11-level Cascaded H-bridge Grid-tied DC-AC Inverter Interface with Solar Panels,” *Posters at the Capitol*, Nashville Tennessee Capitol, Nashville, TN, March 2011.
- [P1] **Y. Cao**, F. Filho, L. M. Tolbert, “Multilevel DC-AC Converter Interface with Solar Panels,” *Exhibition of Undergraduate Research and Creative Achievement (EUR̄CA)*, University of Tennessee, April 2009.

FUNDING RECORDS

Sponsored PI Awards

Total my share (as PI or co-PI) – \$3,324,000

Total OSU share under my point of contact – \$2,620,000

All figures here do not include required cost share where applicable.

[A15] **OSU co-PI**, 01/2023 – 12/2025

Sponsor: DOE WPTO

Lead Institution: Oregon State University

OSU Lead PI: Ted Brekken

Total – \$1,930,000, OSU share – \$1,200,000 (62%), my share – \$325,000 (17%)
“Hybrid Hydropower-Storage Units for Greater Operational Flexibility”

[A14] **Project Lead PI**, 06/2022 – 05/2027

Sponsor: NSF CAREER

Total – \$500,000, OSU share – \$500,000 (100%), my share – \$500,000 (100%)

“CAREER: Universal Modeling of Real and Virtual Energy Storage with Connected Power Electronics”

[A13] **OSU Lead PI**, 07/2022 – 06/2026

Sponsor: DOE VTO

Lead Institution: Daimler Trucks North America

Total – \$25,792,000, OSU share – \$860,000 (3%), my share – \$550,000 (2%)

“Supertruck 3: Ultra-Efficient Long Haul Hydrogen Fuel Cell Tractor”

[A12] **OSU co-PI**, 01/2022 – 01/2024

Sponsor: US Navy NAVFAC

Lead Institution: University of Washington

OSU Lead PI: Bryson Robertson

Total – \$4,500,000, OSU share – \$2,285,000 (50%), my share – \$242,000 (5%)

“NAVFAC Marine Energy Hybrid Microgrid”

[A11] **OSU co-PI**, 09/2021 – 12/2021

Sponsor: DOE EERE WPTO TEAMER

Lead Institution: Oscilla Power

OSU Lead PI: Ted Brekken

Total – N/A, OSU share – \$100,000, my share – \$40,000 (40%)

“Energy Storage Analysis for Wave Energy Converters”

[A10] **OSU co-PI**, 08/2021 – 06/2022

Sponsor: DOE NETL

Lead Institution: Oregon State University

OSU Lead PI: Adam Schultz

Total – \$393,000, OSU share – \$393,000 (100%), my share – \$76,000 (20%)

“Offshore Research: CSEM for Geohazard Identification – Pulsed Power with Supercapacitor”

[A9] **OSU Lead PI**, 11/2021 – 10/2022

Sponsor: DOE ARPA-E LOCOMOTIVES

Lead Institution: North Carolina State University

Total – \$1,500,000, OSU share – \$150,000 (10%), my share – \$150,000 (10%)

“Lowering CO₂: Models to Optimize Train Infrastructure, Vehicles, and Energy Storage: Multi-Decadal Decarbonization Pathways for U.S. Freight Rail”

[A8] **OSU co-PI**, 10/2021 – 09/2025

Sponsor: DOE EERE WPTO

Lead Institution: University of Alaska, Fairbanks

OSU Lead PI: Eduardo Cotilla-Sanchez

Total – \$1,500,000, OSU share – \$750,000 (50%), my share – \$350,000 (20%)

“Modeling the Integration of Marine Energy into Microgrids”

[A7] **OSU co-PI**, 10/2021 – 09/2025

Sponsor: DOE EERE WPTO

Lead Institution: University of Washington, Seattle

OSU Lead PI: Ted Brekken

Total – \$1,500,000, OSU share – \$950,000 (63%), my share – \$155,000 (10%)

“A Unified Multiphysics Approach for Modeling, Control, and Optimization of Wave Energy Converters”

[A6] **OSU Lead PI**, 10/2021 – 09/2024

Sponsor: DOE ARPA-E SHARKS

Lead Institution: University of Michigan, Ann Arbor

Total – \$3,900,000, OSU share – \$680,000 (18%), my share – \$506,000 (14%)

“RAFT: Reconfigurable Array of High-efficiency Ducted Turbines for Hydrokinetic Energy Harvesting”

[A5] **Project Lead PI**, 01/2021 – 12/2023

Sponsor: Portland General Electric

Total – \$100,000, OSU share – \$100,000 (100%), my share – \$100,000 (100%)

“Large-signal PV Inverter Enhanced Grid Model for Rural Area Voltage Stability Analysis and Control”

[A4] **Project Lead PI**, 01/2021 – 12/2023

Sponsor: Portland General Electric

Total – \$100,000, OSU share – \$100,000 (100%), my share – \$100,000 (100%)

“Pulsed Power DC Microgrid for Remote Area Highway Fast Charging Stations”

[A3] **Project Lead PI**, 09/2020 – 09/2021

Sponsor: Grainger Foundation

Total – \$25,000, OSU share – \$25,000 (100%), my share – \$25,000 (100%)

“High-frequency Low-ripple Variable-phase Motor Drives”

[A2] **Project Lead PI**, 03/2020 – 02/2021

Sponsor: Oregon State Learning Innovation Center

Total – \$9,000, OSU share – \$9,000 (100%), my share – \$9,000 (100%)

“Power Electronics Enabled E-Mobility Education Innovation”

[A1] **Project Lead PI**, 05/2019 – 07/2020

Sponsor: Amazon Prime Air

Total – \$196,000, OSU share – \$196,000 (100%), my share – \$196,000 (100%)

“Advanced Propulsion Systems for Autonomous Delivery Unmanned Aerial Vehicles”

Unrestricted Gifts

[GA1] **Lead Recipient**, 05/2019

Sponsor: Lai Family to Oregon State University Foundation

Total - \$17,600, my share - \$17,600 (100%)

“In support of research in power electronics for renewable energy and electrified transportation”

Sponsored Student Projects

[SA3] Student Lead, 01/2016 – 05/2017

Sponsor: NSF ERC Center for Power Optimization of Electro-Thermal Systems (POETS)

Total - \$55,000, my share - \$55,000 (100%)

“Power electronics implementation of dynamic thermal inertia to mitigate source and load variability in large energy systems, including low-energy buildings and more electric aircraft”

[SA2] Student Contributor, 01/2010 – 05/2011

Sponsor: US Environmental Protection Agency (EPA), Univ. of Tennessee Office of Research

Total - \$47,000, my share - \$15,667 (33%)

“Bug-EV: single passenger urban commute electric vehicle and fuel-cell hybrid electric vehicle”

[SA1] Student Lead, 08/2009 – 05/2011

Sponsor: Univ. of Tennessee Office of Research, Chancellor’s Honors Program

Total - \$8,000, my share - \$8,000 (100%)

“Grid-tied 11-level multilevel dc-ac inverter interface with solar panels”