

# YICHENG ZHU

📍 406 Cory Hall, Berkeley, CA 94720 ✦ 📞 (510) 206-4658  
✉ [yczhu@berkeley.edu](mailto:yczhu@berkeley.edu) ✦ 🏠 [Website](#) ✦ 🎓 [Google Scholar](#) ✦ 🌐 [Linkedin](#)

## ACADEMIC POSITION

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**University of California, Berkeley** Berkeley, CA, USA  
Postdoctoral Scholar in the Department of Electrical Engineering and Computer Sciences July 2024 – Present

- Advisor: Professor Robert Pilawa-Podgurski [🔗](#)
- Bakar Innovation Fellow [🔗](#)

## EDUCATION

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**University of California, Berkeley** Berkeley, CA, USA  
Doctor of Philosophy (Ph.D.) in Electrical Engineering and Computer Sciences Aug. 2020 – May 2024

- Advisor: Professor Robert Pilawa-Podgurski [🔗](#)
- Thesis: *High-Performance Hybrid Switched-Capacitor Power Converters: Circuit Topologies, Control Techniques, and Analytical Models*

**Tsinghua University** Beijing, China  
Master of Science (M.S.) in Electrical Engineering Sept. 2017 – July 2020

- Advisor: Professor Zhengming Zhao [🔗](#)
- Thesis: *Analysis and Control of SiC MOSFET Switching Transients*

Bachelor of Engineering (B.Eng.) in Electrical Engineering and Automation Aug. 2013 – June 2017

## AWARDS AND HONORS

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### Fellowships and Scholarships

NVIDIA Graduate Fellowship [🔗](#) 2023 – 2024

- Awarded to 5 Ph.D. students worldwide involved in research that spans all areas of computing innovation.

Berkeley Fellowship [🔗](#) 2020 – 2022

- Awarded to outstanding Ph.D. applicants by UC Berkeley Graduate Division.

IEEE Power & Energy Society Outstanding Student Scholarship [🔗](#) May 2020

- Awarded to 5 PES student members worldwide.

### Papers and Presentations

Best Paper Award: Open Compute Project Future Technologies Symposium [🔗](#) Oct. 2023

- Awarded to 1 paper in the Power and Server track.

Best Paper Award: IEEE 24th Workshop on Control and Modeling for Power Electronics [🔗](#) June 2023

- For conference paper [C15]. Awarded to 3 out of 84 accepted papers.

### Teaching and Mentorship

Teaching Effectiveness Award [🔗](#) May 2024

- Awarded to 15 outstanding graduate student instructors (GSIs) university-wide by the UC Berkeley GSI Teaching and Resource Center.

Outstanding Graduate Student Instructor Award [🔗](#) Mar. 2024

- Awarded to up to 10% of the GSIs appointed by the Berkeley EECS department.

### Academic Performance

Ross N. Tucker Memorial Award [🔗](#) April 2024













- Awarded to 1 Ph.D. student department-wide in recognition of superior work and scholarship in the characterization, development and/or use of semiconductor, magnetic, optical or electronic materials.

Outstanding Tsinghua Master's Thesis Award	June 2020
• Awarded to 3 master's students department-wide.	
Graduate with Distinction (Masters Student)	June 2020
• Awarded to 2 master's students department-wide.	
Graduate with Distinction (Undergraduate Student)	June 2017
• Top 5% department-wide.	
Tsinghua Scholarship of Academic Excellence	
• Received in the Master's (2019, 2018), Senior (2016), Junior (2015), and Sophomore (2014) years.	
<b>Research Competition</b>	
Grand Prize of the 34 <sup>th</sup> Tsinghua <i>Challenge Cup</i> Student Research Competition (Team leader)	Apr. 2016
• Awarded to 6 out of more than 300 teams from all departments of Tsinghua University.	
<b>Leadership and Service</b>	
Tsinghua Outstanding Student Leader Award	Oct. 2016




















## SELECTED PUBLICATIONS

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### Journal Articles

- [J13] **Y. Zhu**, J. Zou, and R. C. N. Pilawa-Podgurski, "A 1500-A/48-V-to-1-V Switching Bus Converter for Next-Generation Ultra-High-Power Processors," in *IEEE Transactions on Power Electronics*, vol. 39, no. 9, pp. 11340-11355, Sept. 2024. | [Link](#) 
- [J12] **Y. Zhu**, T. Ge, N. M. Ellis, L. Horowitz, and R. C. N. Pilawa-Podgurski, "The Switching Bus Converter: A High-Performance 48-V-to-1-V Architecture with Increased Switched-Capacitor Conversion Ratio," in *IEEE Transactions on Power Electronics*, vol. 39, no. 7, pp. 8384-8403, July 2024. | [Link](#) 
- [J11] **Y. Zhu**, Z. Ye, and R. C. N. Pilawa-Podgurski, "Modeling and Analysis of Switched-Capacitor Converters With Finite Terminal Capacitances," in *IEEE Transactions on Power Electronics*, vol. 39, no. 6, pp. 6640-6653, June 2024. | [Link](#) 
- [J10] **Y. Zhu**, Z. Zhao, B. Shi, and Z. Yu, "Discrete State Event-Driven Framework with a Flexible Adaptive Algorithm for Simulation of Power Electronics Systems," in *IEEE Transactions on Power Electronics*, vol. 34, no. 12, pp. 11692-11705, Dec. 2019. | [Link](#) 
- [J9] B. Shi, Z. Zhao, D. Tan, and **Y. Zhu**, "Integral Control of Megawatt Power Electronic Systems as Generalized Hybrid Systems," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 10, no. 4, pp. 4254-4274, Aug. 2022. | [Link](#) 
- [J8] B. Shi, Z. Zhao, J. Ju, Z. Yu, and **Y. Zhu**, "Switching Transient Simulation and System Efficiency Evaluation of Megawatt Power Electronics Converter With Discrete State Event-Driven Approach," in *IEEE Transactions on Industrial Electronics*, vol. 69, no. 3, pp. 2180-2190, March 2022. | [Link](#) 
- [J7] B. Shi, Z. Zhao, **Y. Zhu**, and X. Wang, "Time-Domain and Frequency-Domain Analysis of SiC MOSFET Switching Transients Considering Transmission of Control, Drive, and Power Pulses," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 9, no. 5, pp. 6441-6452, Oct. 2021. | [Link](#) 
- [J6] B. Shi, Z. Zhao, **Y. Zhu**, Z. Yu, and J. Ju, "Discrete State Event-Driven Simulation Approach With a State-Variable-Interfaced Decoupling Strategy for Large-Scale Power Electronics Systems," in *IEEE Transactions on Industrial Electronics*, vol. 68, no. 12, pp. 11673-11683, Dec. 2021. | [Link](#) 
- [J5] Z. Yu, Z. Zhao, B. Shi, **Y. Zhu**, and J. Ju, "An Automated Semi-Symbolic State Equation Generation Method for Simulation of Power Electronic Systems," in *IEEE Transactions on Power Electronics*, vol. 36, no. 4, pp. 3946-3956, April 2021. | [Link](#) 
- [J4] Y. Ling, Z. Zhao, and **Y. Zhu**, "A Self-Regulating Gate Driver for High-Power IGBTs," in *IEEE Transactions on Power Electronics*, vol. 36, no. 3, pp. 3450-3461, Mar. 2021. | [Link](#) 
- [J3] Z. Zhao, D. Tan, B. Shi, **Y. Zhu**, and H. Jin, "A Breakthrough in Design Verification of Megawatt Power Electronic Systems," in *IEEE Power Electronics Magazine*, vol. 7, no. 3, pp. 36-43, Sept. 2020. | [Link](#) 
- [J2] B. Shi, Z. Zhao, and **Y. Zhu**, "Piecewise Analytical Transient Model for Power Switching Device Commutation Unit," in *IEEE Transactions on Power Electronics*, vol. 34, no. 6, pp. 5720-5736, June 2019. | [Link](#) 
- [J1] X. Wang, Z. Zhao, K. Li, **Y. Zhu**, and K. Chen, "Analytical Methodology for Loss Calculation of SiC MOSFETs," in *IEEE Journal of Emerging and Selected Topics in Power Electronics*, vol. 7, no. 1, pp. 71-83, Mar. 2019. | [Link](#) 

## Conference Proceedings


- [C17] **Y. Zhu**, J. Zou, and R. C. N. Pilawa-Podgurski, "A 1500-A/48-V-to-1-V Switching Bus Converter for Next-Generation Ultra-High-Power Microprocessors," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Long Beach, CA, USA, Feb. 2024, pp. 890-897. | [Link](#) 
- [C16] **Y. Zhu**, N. M. Ellis, and R. C. N. Pilawa-Podgurski, "Comparative Performance Analysis of Regulated Hybrid Switched-Capacitor Topologies for Direct 48 V to Point-of-Load Conversion," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Nashville, TN, USA, Oct. 2023, pp. 3313-3320. | [Link](#) 
- [C15] **Y. Zhu**, T. Ge, N. M. Ellis, J. Zou, and R. C. N. Pilawa-Podgurski, "A 48-V-to-1-V Switching Bus Converter for Ultra-High-Current Applications," in *Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*, Ann Arbor, MI, USA, Jun. 2023, pp. 1-8. | [Link](#)  [ **COMPEL Best Paper Award**]
- [C14] H. B. Sambo, **Y. Zhu**, and R. C. N. Pilawa-Podgurski, "Autotuning of Resonant Switched-Capacitor Converters for Zero Voltage Switching," in *Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*, Ann Arbor, MI, USA, Jun. 2023, pp. 1-8. | [Link](#) 
- [C13] N. Biesterfeld, **Y. Zhu**, R. K. Iyer, N. M. Ellis, and R. C. N. Pilawa-Podgurski, "Steady-State Analysis of Series-Capacitor Buck Converters in Discontinuous Capacitor Voltage Mode," in *Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*, Ann Arbor, MI, USA, Jun. 2023, pp. 1-6. | [Link](#) 
- [C12] **Y. Zhu**, T. Ge, N. M. Ellis, L. Horowitz, and R. C. N. Pilawa-Podgurski, "A 500-A/48-to-1-V Switching Bus Converter: A Hybrid Switched-Capacitor Voltage Regulator with 94.7% Peak Efficiency and 464-W/in<sup>3</sup> Power Density," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, USA, Mar. 2023, pp. 1989-1996. | [Link](#) 
- [C11] T. Ge, **Y. Zhu**, and R. C. N. Pilawa-Podgurski, "A Regulated Cascaded Hybrid Switched-Capacitor Converter with Soft-Charging and Zero Voltage Switching for 48-to-12-V Applications," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, USA, Mar. 2023, pp. 1982-1988. | [Link](#) 
- [C10] H. B. Sambo, **Y. Zhu**, T. Ge, N. M. Ellis, and R. C. N. Pilawa-Podgurski, "Autotuning of Resonant Switched-Capacitor Converters for Zero Current Switching and Terminal Capacitance Reduction," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Orlando, FL, USA, Mar. 2023, pp. 1217-1224. | [Link](#) 
- [C9] **Y. Zhu**, T. Ge, Z. Ye, and R. C. N. Pilawa-Podgurski, "A Dickson-Squared Hybrid Switched-Capacitor Converter for Direct 48 V to Point-of-Load Conversion," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Houston, TX, USA, Mar. 2022, pp. 1272-1278. | [Link](#)  [ **APEC Student Travel Award**]
- [C8] **Y. Zhu**, Z. Ye, T. Ge, and R. C. N. Pilawa-Podgurski, "Multi-Resonant Compensation Control for Terminal Capacitance Reduction in Resonant Switched-Capacitor Converters," in *Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*, Cartagena, Colombia, Nov. 2021, pp. 1-6. | [Link](#) 
- [C7] **Y. Zhu**, Z. Ye, and R. C. N. Pilawa-Podgurski, "Modeling and Analysis of Resonant Switched-Capacitor Converters with Finite Terminal Capacitances," in *Proc. IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)*, Cartagena, Colombia, Nov. 2021, pp. 1-6. | [Link](#) 
- [C6] **Y. Zhu**, Z. Ye, T. Ge, R. Abramson, and R. C. N. Pilawa-Podgurski, "A Multi-Phase Cascaded Series-Parallel (CaSP) Hybrid Converter for Direct 48 V to Point-of-Load Applications," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Vancouver, BC, Canada, Oct. 2021, pp. 1973-1980. | [Link](#) 
- [C5] **Y. Zhu**, Z. Ye, and R. C. N. Pilawa-Podgurski, "Modeling and Analysis of Switched-Capacitor Converters with Finite Terminal Capacitances," in *Proc. IEEE Applied Power Electronics Conference and Exposition (APEC)*, Phoenix, AZ, USA, June 2021, pp. 178-185. | [Link](#) 
- [C4] **Y. Zhu**, Z. Zhao, B. Shi, J. Ju, Z. Yu, L. Yuan, and K. Chen, "Discrete State Event-Driven Framework for Simulation of Switching Transients in Power Electronic Systems," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Baltimore, MD, USA, Oct. 2019, pp. 895-900. | [Link](#) 
- [C3] B. Shi, Z. Zhao, **Y. Zhu**, Z. Yu, J. Ju, L. Yuan, and K. Chen, "Discrete State Event-Driven Approach for High-Power Converter Simulations," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Baltimore, MD, USA, Oct. 2019, pp. 4627-4631. | [Link](#) 
- [C2] Y. Ling, Z. Zhao, and **Y. Zhu**, "A Novel Digital Active Gate Driver for High-Power IGBT to Reduce Switching Losses and Stresses," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Baltimore, MD, USA, Oct. 2019, pp. 4189-4194. | [Link](#) 
- [C1] X. Wang, Z. Zhao, **Y. Zhu**, K. Chen, and L. Yuan, "A Comprehensive Study on the Gate-Loop Stability of the SiC MOS-FET," in *Proc. IEEE Energy Conversion Congress and Exposition (ECCE)*, Cincinnati, OH, USA, Oct. 2017, pp. 3012-3018. | [Link](#) 

## Issued Patent

- [P1] **Y. Zhu**, Z. Zhao, B. Shi and Z. Yu, "Discrete State Event-Driven Simulation Method for Simulation of Power electronics system," US Patent No. 10,970,432, issued Apr. 6, 2021. | [Link](#) 

## INVITED TALK



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[T1] “The Switching Bus Converter: Towards 48-V-to-1-V Single-Stage Vertical Power Delivery for Data Center Storage,” *IEEE Power Electronics Society Young Professional Webinar Series*, Host: Dr. Joseph Kozak, May 7, 2024. | [Link](#) 

## TEACHING EXPERIENCE

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### Department of Electrical Engineering and Computer Sciences, UC Berkeley

Graduate Student Instructor, EE 113/213A: Power Electronics [  **Outstanding GSI Award**] Fall 2023  
[  **Teaching Effectiveness Award**]

Graduate Student Instructor, EE 290: Advanced Topics in Electrical Engineering (graduate-level) Spring 2023

### Department of Electrical Engineering, Tsinghua University

Teaching Assistant, Design and Analysis of Electrical Machine Systems (40220682) Spring 2018

## INDUSTRY EXPERIENCE

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### NVIDIA Corporation

Santa Clara, CA, USA

Ph.D. Research Intern, Circuits Research Group (CRG)

May 2023 – Aug. 2023

- Designed a switching bus converter [J13][J12] prototype to enable single-stage vertical power delivery (VPD) for next-generation GPU-accelerated computing platforms.

## LEADERSHIP AND SERVICE

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### Secretary of the IEEE Power and Energy Chapter

Jan. 2023 – Dec. 2023

University of California, Berkeley

### Deputy Secretary of the Student Union

Aug. 2015 – July 2016

Department of Electrical Engineering, Tsinghua University

- Organized the departmental social practice activities and *the 2015 Social Practice Annual Conference* (one of the most influential departmental activities) as the primary organizer.

### Professional Activities

- Reviewer** IEEE Transactions on Power Electronics (TPEL)  
IEEE Transactions on Industrial Electronics (TIE)  
IEEE Journal of Emerging and Selected Topics in Power Electronics (JESTPE)  
IEEE Journal of Emerging and Selected Topics in Industrial Electronics (JESTIE)  
IEEE Open Journal of Power Electronics (OJPEL)  
IEEE Open Journal of the Industrial Electronics Society (OJIES)  
IEEE Transactions on Circuits and Systems II: Express Briefs (TCAS-II)  
IEEE Energy Conversion Congress and Exposition (ECCE)  
IEEE Applied Power Electronics Conference and Exposition (APEC)  
IEEE Workshop on Control and Modeling for Power Electronics (COMPEL)

**Volunteer** 2018 IEEE International Future Energy Challenge (IFEC 2018)