Jason Poon

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Stanford, CA 94305-4020

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Education

Postdoc **Stanford University** **9/2019 – Present**
Department of Electrical Engineering, Power Electronics Research Lab
Advisor: Juan M. Rivas-Davila

Ph.D. **University of California, Berkeley**
Electrical Engineering and Computer Sciences **8/2013 – 8/2019**
Dissertation: "Circuits and Systems for Decentralized Power Conversion"
Advisor: Seth R. Sanders

M.S. **University of California, Berkeley**
Electrical Engineering and Computer Sciences **8/2013 – 12/2015**
Thesis: "Model-Based Fault Detection and Identification for Power Electronics Systems"
Advisor: Seth R. Sanders

B.S. **Olin College of Engineering**
Electrical and Computer Engineering **8/2008 – 5/2012**

Fellowships and Awards

EERE Postdoctoral Research Award, Department of Energy	**2019**
Outstanding Reviewer, IEEE Transactions on Energy Conversion	**2018**
Best Paper Award, IEEE 17th Workshop on Control and Modeling for Power Electronics	**2016**
NSF Graduate Research Fellowship, National Science Foundation	**2013 – 2016**
National Defense Science & Engineering Graduate Fellowship, Department of Defense (awarded)	**2013**
UC Berkeley EECS Departmental Excellence Award, University of California, Berkeley	**2013**
Full-Tuition Merit Scholarship, Franklin W. Olin College of Engineering	**2008 – 2012**

Publications

Papers in Refereed Journals

J9. **J. Poon**, M. Sinha, S. V. Dhople, J. M. Rivas, "Real-time selective harmonic minimization using a hybrid analog/digital computing method," IEEE Transactions on Power Electronics, Submitted.

J8. **J. Poon**, B. B. Johnson, S. V. Dhople, J. M. Rivas, "Decentralized carrier phase-shifting for parallel-connected inverters for optimal harmonic minimization," IEEE Transactions on Power Electronics, vol. 35, no. 10, pp. 11013-11025, May 2021.

J7. **J. Poon**, B. B. Johnson, S. V. Dhople, S. R. Sanders, "Minimum Distortion Point Tracking," IEEE Transactions on Power Electronics, vol. 35, no. 10, pp. 11013-11025, Oct. 2020.

J6. P. Jain, **J. Poon**, J. Singh, P. Jain, C. Spanos, S. Panda, S. R. Sanders, "A digital twin approach for fault diagnosis in distributed photovoltaic systems," IEEE Transactions on Power Electronics, vol. 35, no. 1, pp. 940-956, Jan. 2020.

J5. M. Sinha, **J. Poon**, B. B. Johnson, M. Rodriguez, S. V. Dhople, "Decentralized interleaving of parallel-connected buck converters," IEEE Transactions on Power Electronics, vol. 34, no. 5, pp. 4993-5006, May 2019.

J4. **J. Poon**, P. Jain, C. Spanos, S. Panda, S. R. Sanders, "Fault prognosis for power electronics systems using adaptive parameter identification," IEEE Transactions on Industry Applications, vol. 53, no. 3, pp. 2862-2870, May-June 2017.

J3. **J. Poon**, P. Jain, I. Konstantakopoulos, C. Spanos, S. Panda, S. R. Sanders, "Model-based fault detection and identification for switching power converters," IEEE Transactions on Power Electronics, vol. 32, no. 2, pp. 1419-1430, Feb. 2017.

J2. P. A. Madduri, **J. Poon**, J. Rosa, M. Podolsky, E. Brewer, S. R. Sanders, "Scalable dc microgrids for rural electrification in emerging regions," IEEE Journal of Emerging and Selected Topics in Power Electronics, vol. 4, no. 4, pp. 1195-1205, Dec. 2016.

J1. X. Ding, **J. Poon**, I. Čelanović, A.D. Domínguez-García, "Fault detection and isolation filters for three-phase ac-dc power electronics systems," IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 60, no. 4, pp. 1038-1051, April 2013.

Papers in Refereed Conference Proceedings

C18. **J. Poon**, M. Sinha, S. V. Dhople, J. M. Rivas, "Real-time selective harmonic minimization using hybrid analog/digital computing," 2021 IEEE Applied Power Electronics Conference and Exposition (APEC), 2021.

C17. **J. Poon**, B. B. Johnson, S. V. Dhople, S. R. Sanders, "Minimum Distortion Point Tracking: Optimal phase shifting for input- or output-parallel connected dc-dc converters," 2018 IEEE 19th Workshop on Control and Modeling for Power Electronics (COMPEL), Padova, Italy, 2018.

C16. P. Jain, L. Jian, **J. Poon**, C. Spanos, S. R. Sanders, J. Xu, S. Panda, "An improved robust adaptive parameter identifier for dc-dc converters using H-infinity design," 2018 IEEE Applied Power Electronics Conference and Exposition (APEC), San Antonio, TX, 2018.

C15. P. Jain, L. Jian, **J. Poon**, C. Spanos, S. R. Sanders, J. Xu, S. Panda, "A Luenberger observer-based fault detection and identification scheme for photovoltaic dc-dc converters," 2017 43rd Annual Conference of the IEEE Industrial Electronics Society, Beijing, China, 2017.

C14. **J. Poon**, P. Jain, C. Spanos, S. Panda, S. R. Sanders, "Photovoltaic condition monitoring using real-time adaptive parameter identification," 2017 IEEE Energy Conversion Congress and Exposition (ECCE), Cincinnati, OH, 2017.

C13. **J. Poon**, S. R. Sanders, "Analysis and design of an adaptive parameter estimator for power electronics circuits," 2017 IEEE 18th Workshop on Control and Modeling for Power Electronics (COMPEL), Stanford, CA, 2017.

C12. M. Sinha, B. B. Johnson, M. Rodriguez, **J. Poon**, and S. V. Dhople, "Decentralized interleaving of paralleled dc-dc buck converters," 2017 IEEE 18th Workshop on Control and Modeling for Power Electronics (COMPEL), Stanford, CA, 2017.

C11. P. Jain, **J. Poon**, J. Xu, C. Spanos, S. R. Sanders, S. Panda, "Fault diagnosis via PV panel-integrated power electronics," 2016 IEEE 17th Workshop on Control and Modeling for Power Electronics (COMPEL), Trondheim, Norway, 2016. **Best Paper Award**

C10. **J. Poon** et al., "FailSafe: A generalized methodology for converter fault detection, identification, and remediation in nanogrids," 2015 IEEE International Conference on Building Efficiency and Sustainable Technologies, Singapore, 2015, pp. 73-78.

C9. Y. Li, M. John, **J. Poon**, J. Chen and S. R. Sanders, "Lossless voltage regulation and control of the resonant switched-capacitor DC-DC converter," 2015 IEEE 16th Workshop on Control and Modeling for Power Electronics (COMPEL), Vancouver, BC, 2015, pp. 1-7.

C8. **J. Poon**, I. C. Konstantakopoulos, C. Spanos and S. R. Sanders, "Real-time model-based fault diagnosis for switching power converters," 2015 IEEE Applied Power Electronics Conference and Exposition (APEC), Charlotte, NC, 2015, pp. 358-364.

C7. P. A. Madduri, **J. Poon**, J. Rosa, M. Podolsky, E. Brewer and S. R. Sanders, "A scalable dc microgrid architecture for rural electrification in emerging regions," 2015 IEEE Applied Power Electronics Conference and Exposition (APEC), Charlotte, NC, 2015, pp. 703-708.

C6. **J. Poon**, E. Chai, I. Čelanović, A. Adrien Genić and E. Adzic, "High-fidelity real-time hardware-in-the-loop emulation of PMSM inverter drives," 2013 IEEE Energy Conversion Congress and Exposition (ECCE), Denver, CO, 2013, pp. 1754-1758.

C5. E. Chai, **J. Poon** and I. Čelanović, "Validation of frequency- and time-domain fidelity of an ultra-low latency hardware-in-the-loop (HIL) emulator," 2013 IEEE 14th Workshop on Control and Modeling for Power Electronics (COMPEL), Salt Lake City, UT, 2013, pp. 1-5.

C4. **J. Poon**, A. Genić, X. Ding, A. Domínguez-García and I. Čelanović, "A linear-switched observer for large-signal state estimation in power electronics," Power Electronics and Motion Control Conference (EPE/PEMC), 2012 15th International, Novi Sad, 2012, pp. LS3b.3-1-LS3b.3-5.

C3. **J. Poon**, M. A. Kinsy, N. A. Pallo, S. Devadas and I. L. Čelanović, "Hardware-in-the-loop testing for electric vehicle drive applications," 2012 Twenty-Seventh Annual IEEE Applied Power Electronics Conference and Exposition (APEC), Orlando, FL, 2012, pp. 2576-2582.

C2. M. Kinsy, D. Majstorovic, **J. Poon**, N. Čelanović, I. Čelanović, S. Devadas, "High-speed real-time digital emulation for hardware-in-the-loop testing of power electronics," Power Electronics/Intelligent Motion/Power Quality Conference (PCIM), Nuremburg, Germany, May 2011.

C1. **J. Poon**, P. Haessig, J. G. Hwang and I. Čelanović, "High-speed hardware-in-the loop platform for rapid prototyping of power electronics systems," Innovative Technologies for an Efficient and Reliable Electricity Supply (CITRES), 2010 IEEE Conference on, Waltham, MA, 2010, pp. 420-424.

Technical Reports

R1. M. Kinsy, **J. Poon**, I. Čelanović, O. Khan, S. Devadas, "A multicore architecture for control and emulation of power electronics and smart grid systems under hard real-time constraints," Work-in-Progress Presentation at 49th Design Automation Conference, San Francisco, June 2012.

Theses

T2. **J. Poon**, "Circuits and Systems for Decentralized Power Conversion," Ph.D. Dissertation, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, 2019.

T1. **J. Poon**, "Fault Detection and Identification for Distributed Power Electronics Systems," M.S. Thesis, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, 2015.

Patents

Patents Pending

P1. **J. Poon**, "A hybrid analog/digital circuit for solving nonlinear programming problems," Patent Application No. 63143856.

Teaching

Stanford University

EE 157: Electric Motors for Renewable Energy, Robotics, and Electric Vehicles, Co-Instructor **Autumn AY21/22**

University of California, Berkeley

EE 113/213: Power Electronics, Graduate Student Instructor and Guest Lecturer **Spring AY17/18**
Evaluation Score: 5.00/5.00 (Department Average: 4.15/5.00)

EE 113/213: Power Electronics, Graduate Student Instructor **Spring AY16/17**
Evaluation Score: 4.71/5.00 (Department Average: 3.96/5.00)

EE 113: Power Electronics, Graduate Student Instructor **Spring AY15/16**
Evaluation Score: N/A

Service

Professional Service

Member-at-Large **2019 – 2020, 2021 – Present**
IEEE Power Electronics Society, San Francisco Bay Area Chapter

Vice Chair **2020 – 2021**
IEEE Power Electronics Society, San Francisco Bay Area Chapter

Committee Assistant **2019 – Present**
Power Conversion Systems and Components Committee, IEEE Power Electronics Society

Organizing Committee Member **2017**
2017 IEEE 18th Workshop on Control and Modeling for Power Electronics (COMPEL)

Student Branch Chapters Area Chair **2016 – 2019**
IEEE Industrial Application Society, Region 4 and 6

Founding Chair **2016 – 2019**
IEEE Industrial Applications Society, UC Berkeley Student Branch Chapter

Founding Chair **2015 – 2019**
IEEE Power Electronics Society, UC Berkeley Student Branch Chapter

General Chair **2015 – 2019**
UC Berkeley Power Electronics Seminar Series

Editorial and Reviewer Service

Journal Reviewer **2009 – Present**
IEEE Transactions on Power Electronics, IEEE Journal of Emerging and Selected Topics in Power Electronics, IEEE Transactions on Energy Conversion, IEEE Transactions on Industrial Applications, IEEE Transactions on Industrial Electronics, IEEE Transactions on Control Systems Technology, Applied Energy, IEEE Transactions on Reliability, IEEE Transactions on Power Systems, IEEE Transactions on Industrial Informatics, IEEE Transactions on Aerospace and Electronic Systems, IEEE Industry Applications Magazine, IEEE Transactions on Control of Network Systems, International Transactions on Electrical Energy Systems, International Journal of Robust and Nonlinear Control, IEEE Accesss

Conference Reviewer **2009 – Present**
IEEE Applied Power Electronics Conference, IEEE Energy Conversion Conversion Congress and Exposition, IEEE Workshop on Control and Modeling for Power Electronics, Annual Conference of the IEEE Industrial Electronics Society, IEEE International Symposium on Circuits and Systems

Other Educational Activities

Participant **2020**
NSF Workshop on Forging Connections between Machine Learning, Data Science, & Power Systems Research, Alexandria, VA.

Participant and Scribe **2019**
NSF Workshop on Power Electronics-enabled Operation of Power Systems, Chicago, IL

Invited Participant **2019**
2019 Symposium on Microgrids, Fort Collins, CO

Participant **2019**
Workshop on Grid-Forming Inverters for Low-Inertia Power Systems, Seattle, WA

Student Mentoring

Undergraduate Research Advisor

Cam Twarog, Stanford REU Program **6/2021 – Present**
Project Title: "Analog Computing Techniques for Renewable Energy Applications"

Brian Kaether, Stanford REU Program **6/2020 – Present**
Project Title: "MOCHA: A Modular and Open-source Control and Hardware Library for Power Electronics"

Weichen Yu, Undergraduate Research Project **2/2019 – 8/2019**
Project Title: "Analysis and Design of Spectral Estimation Techniques for Power Electronics"

Kaiyuan Fan, Undergraduate Research Project **2/2019 – 8/2019**
Project Title: "FPGA Implementation of Spectral Estimation Techniques for Power Electronics"

Chuqiao Li, Bachelors Dissertation Project **1/2018 – 8/2018**
Project Title: "Spectral Estimation Techniques for Minimum Distortion Point Tracking"

Zeyu Song, Undergraduate Research Project **1/2018 – 8/2018**
Project Title: "Analysis and Implementation of Injection Locked Oscillators for PWM Carrier Generation"

Jiao Hongsheng, Masters Dissertation Project **1/2018 – 4/2018**
Project Title: "Fault Diagnosis in DC Bus Connected Module-level Power Electronics Type PV Systems"

Deru Song, Masters Dissertation Project **8/2014 – 12/2014**
Project Title: "Model-Based Fault Diagnosis For Off-Shore Wind Turbine Converters"

Erik Iverson, Undergraduate Research Project **8/2013 – 5/2014**
Project Title: "Multifunction Fan-Out Node for DC Microgrid Applications"

Invited Talks

"The Power Electronics-Enabled Smart Grid"
Stanford University, Smart Grid Seminar **2/2021**

"Growing Electric Networks from the Bottom-Up: Circuits and Systems for Decentralized Power Conversion"
MIT, EECS Special Seminar **3/2019**
Lawrence Berkeley National Laboratory, ETA Seminar **2/2019**

"Minimum Distortion Point Tracking: Principles and Applications"
Dialog Semiconductor, Chandler, Arizona **5/2018**

"Fault Diagnosis for Power Electronics Systems – From Theory to Practice"
Linear Technologies, Colorado Springs, Colorado **9/2017**
Analog Devices, San Jose, California **4/2017**

"Estimation Techniques for Switching Power Converters – Applications for Fault Diagnosis, Condition Monitoring, and Control"

IEEE Power Electronics Society Young Professionals Webinar **7/2016**

"Dependable Power Distribution for Zero-Energy Buildings"

National University of Singapore, CREATE Annual Symposium **1/2016**

Other Employment

Lawrence Berkeley National Laboratory, Berkeley, California **9/2019 – Present**
Affiliate Researcher, Energy Technologies Area

University of California, Berkeley, Berkeley, California **8/2013 – 8/2019**
Graduate Student Researcher, Power Electronics Group

Dialog Semiconductor, Chandler, Arizona **9/2018 – 12/2018**
PMIC Design Engineering Intern, Integrated Circuit Design Engineering Group

National Renewable Energy Laboratory, Golden, Colorado **5/2017 – 12/2017**
Intern, Integrated Devices and Systems Group

National University of Singapore, Singapore **5/2016 – 8/2016**
Visiting Researcher, Electrical Machines and Drives Laboratory **5/2015 – 8/2015**

ABB Corporate Research, Baden-Dättwil, Switzerland **1/2013 – 8/2013**
Intern, Power Electronics Systems Group

Typhoon HIL, Cambridge, Mass.; Novi Sad, Serbia **1/2011 – 1/2013**
Consultant, Research and Development

Massachusetts Institute of Technology, Cambridge, Mass. **5/2009 – 1/2013**
Research Assistant, Institute for Soldier Nanotechnologies