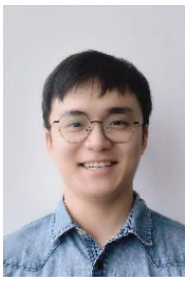
Junwei Huang



jwhuang@um.edu.mo • jwhuang@berkeley.edu • +1 (510) 994-8860

Google Scholar | Homepage

Research Interests: Power management ICs (PMICs); high current density; fast transient response; chiplet/vertical power delivery

EDUCATION

2018.08-2024.07	University of Macau	Electrical and Computer Engineering	Ph.D. Advisors: Prof. Yan Lu and Prof. Chi-Seng Lam
2014.09-2018.06	University of Electronic Science and Technology of China	Microelectronics Science and Engineering	B.Eng.

ACADEMIC APPOINTMENTS

2025.09-present	University of California, Berkeley	Department of Electrical Engineering and Computer Sciences (EECS)	Visiting Postdoctoral Researcher Faculty Host: Prof. Robert Pilawa-Podgurski
2025.09-present	University of Macau	Institute of Microelectronics	Postdoctoral Fellow PI: Prof. Rui P. Martins and Prof. Sai-Weng Sin
2024.11-2025.05	Tsinghua University	Department of Electronic Engineering	Visiting Scholar Faculty Host: Prof. Yan Lu
2024.10-2025.09	University of Macau	Institute of Microelectronics	Research Assistant PI: Prof. Rui. P Martins

RESEARCH SUMMARY

University of Macau, State Key Laboratory of Analog and Mixed-Signal VLSI **2018.08 –present**

- My research focuses on the design of power management chips with high current density and fast transient response. To date, I have published **17** papers in international conferences and journals, including 11 conference papers at **ISSCC (1 highlight paper as first author)**, **CICC**, and **ISCAS**, and 6 journals in **JSSC**, **TCAS-I**, **OJ-SSCS,** and **JOS**
- I was invited to present at **an IEEE PES/PELS event held at UC Berkeley**, recognized for expertise in PMIC design.

University of California, Berkeley, EECS **2025.09 –present**

- My research focuses on the co-design of board-level power electronics and on-package/on-die PMICs, targeting >3,000 A aggregate load and >2.5 A/mm² current density and >4550W/in^3 power density for next-generation CPUs/GPUs.

AWARDS AND ACADEMIC SERVICE

1. Akrostar Technology Academic Prize for the academic year 2023/2024 (Top 3).

2. Reviewer for IEEE Transactions on Industrial Electronics, IEEE Transactions on Circuits and Systems II.

RESEARCH WORK AND PUBLICATIONS

Published (first author):

1. **J. Huang**, X. Mao, Z. Tong, C. -S. Lam, R. P. Martins, Y. Lu, "A Fast-Slow Two-Module High Power Density DC-DC Solution with Transient and Efficiency Improvements," in *IEEE Journal of Solid-State Circuit **(JSSC)***, 2025, accepted.
2. **J. Huang**, X. Mao, Z. Tong, Z. Yu, W. Yang, C. -S. Lam, R. P. Martins, Y. Lu, "A 20MHz-1MHz Dual-Loop Non-Uniform-Multi-Inductor Hybrid DC-DC Converter with Specified Inductor Current Allocation and Fast Transient Response," in *IEEE Int. Solid- State Circuits Conf. **(ISSCC)***, Feb 2025. **(Highlight Paper)**
3. **J. Huang**, Z. Tong, C. -S. Lam, X. Mao, R. P. Martins, Y. Lu, "A Multi-Path Inductor-First Inductor-on-Ground Switched-Capacitor Hybrid DC-DC Converter," *IEEE Journal of Solid-State Circuit **(JSSC)***, 2024**.**
4. **J. Huang**, Z. Tong, X. Mao, C. -S. Lam, R. P. Martins and Y. Lu, " A Fast-Slow Two-Module DC-DC Solution with Transient and Efficiency Improvements for 2.5D/3D Integration," *2024 IEEE Custom Integrated Circuits Conference **(CICC)***, Apr. 2024.
5. **J. Huang,** Z. Tong, Y. Lu, C. -S. Lam, R. P. Martins, "A 5V-to-0.5V Inductor-First Inductor-on-Ground Switched Capacitor Multi-Path Hybrid DC-DC Converter," *2023 IEEE Custom Integrated Circuits Conference **(CICC)***, Apr. 2023.
6. **J. Huang**, C. -S. Lam, Y. Lu and R. P. Martins, "A Symmetrical Double Step-Down Converter with Extended Voltage Conversion Ratio," in *IEEE Trans. Circuits Syst. I: Regular Papers **(TCAS-I)***, 2022

Published (co-author):

7. Z. Tong, **J. Huang**, X. Mao, R. P. Martins and Y. Lu, "A Double Pulse Overlapping Laser Diode Driver with Minimum 100-ps Pulse for LiDAR System", in *IEEE Journal of the Solid-State Circuits **(JSSC)***, 2024.
8. Z. Tong, **J. Huang**, X. Mao, R. P. Martins and Y. Lu, "A Bidirectional USB Power Delivery Voltage-Regulating Cable", in *IEEE Journal of the Solid-State Circuits **(JSSC)*****,2024.**
9. Z. Tong, **J. Huang**, Y. Lu, R. P. Martins, "A 42W Reconfigurable Bidirectional Power Delivery Voltage-Regulating Cable," in *IEEE Int**.** Solid- State Circuits Conf. **(ISSCC)***, Feb 2023. (**Highlight paper**).
10. Y. Lu, **J. Huang**, Z. Tong, T. Hu, W.-L. Zeng, M. Huang, X. Mao and G. Cai, "An Overview of Hybrid DC–DC Converters: From Seeds to Leaves," in *IEEE Open Journal of the Solid-State Circuits Society **(OJSSC)***, 2024.
11. X. Mao, **J. Huang**, Z. Tong, R. P. Martins and Y. Lu, " A Quad-Output Hybrid Buck Converter with 8-Inductor Helping One Spot from All Quarters for Multi-Core XPUs," *2024 IEEE Custom Integrated Circuits Conference **(CICC)***, Apr. 2024.
12. Z. Yu, **J. Huang**, Z. Tong, M. Huang and Y. Lu, "An Always Dual-Path Hybrid DC-DC Converter with Multiphase Interleaving Switched-Capacitor Cell Obtaining 45% Output Ripple Reduction," *IEEE International Symposium on Circuits and Systems **(ISCAS)***, May 2025.
13. F. Luo, **J. Huang**, M. Huang and Y. Lu, "A 12V-Input 1.8V-0.8V-Output Multiple-Output Hybrid Buck DC-DC Converter with a Shared Flying Capacitor," *IEEE International Symposium on Circuits and Systems **(ISCAS)***, May 2025.
14. Y. Hu, **J. Huang**, M. Huang and Y. Lu, "A 5V-to-0.8V Inductor-First 2L2C Multi-Path Hybrid DC-DC Converter," *IEEE International Symposium on Circuits and Systems **(ISCAS)***, May 2025.
15. W. Yang, Z. Tong, **J. Huang**, R. P. Martins and Y. Lu, "A Bi-Directional Dual-Path Boost-Buck Hybrid Converter for High-Voltage Power Transmission Delivery Cable in Humanoid Robots", in *IEEE Journal of the Solid-State Circuits **(JSSC)***, 2025, accepted.
16. Z. Tong, Z. Yu, **J. Huang**, X. Mao, Bernhard Wicht, Rui P. Martins, Yan Lu, "HOOP: A Scalable Hybrid DC-DC Converter Ring for High Performance Computing," in *IEEE Int. Solid- State Circuits Conf. **(ISSCC)***, Feb 2025.
17. W. Yang, Z. Tong, **J. Huang**, R. P. Martins, Y. Lu, "A Bi-Directional Dual-Path Boost-48V-Buck Hybrid Converter for High-

Voltage Power Transmission Cable in Light-Weight Humanoid Robots" in *IEEE Int. Solid- State Circuits Conf.* ***(ISSCC)***, Feb 2025.

18. Z. Tong, W. Yang, S. Han, **J. Huang**, X. Mao, Y. Lu, " Where is the Inductor: A Review and Comparison of the Hybrid DC-DC Buck Topologies," *2025 IEEE Custom Integrated Circuits Conference (**CICC**)*, April 2025.
19. Y. Lu, G. Cai, and **J. Huang**, Favorable basic cells for hybrid DC–DC converters[J]. Journal of Semiconductors (JOS). 2023.