

Junwei Huang

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



EDUCATION

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|-----------------|--|--|--|
| 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

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|-----------------|------------------------------------|---|---|
| 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/in³ 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, 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)**
2. **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.
3. **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.
4. **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.
5. **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):

6. 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.
7. 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.
8. 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)**.
9. 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.
10. 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.
11. 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.
12. 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 XPU's," *2024 IEEE Custom Integrated Circuits Conference (CICC)*, Apr. 2024.
13. 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.
14. 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.
15. 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.
16. 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.
17. Y. Lu, G. Cai, and **J. Huang**, Favorable basic cells for hybrid DC–DC converters[J]. *Journal of Semiconductors (JOS)*. 2023.