

臺北科技大學 終身特聘/講座教授

臺北科技大學電力電子技術中心心 *Founder*

群光北科研發中心 *Director*

光寶北科聯合研發中心 *Director*

Fellow, IEEE

學歷：英國英格蘭 BRISTO 大學電機電子系博士(Oct. 1992~Aug. 1995)

獎勵：教育部國家產學大師獎、國科會傑出研究獎、科技部傑出研究獎、東元獎、IEEE Fellow、IEE John Hopkinson Premium Award、IEEE IAS IDC Prize Paper Award、IEEE JESTPE Prize Paper Award

經歷：國立臺北科技大學終身特聘教授 (2016-)暨電機系主任、 亞力電機獨立董事 (2026-2029)、群光電能獨立董事 (2025-2027)、固緯電子獨立董事 (2024-2027)、亞力電機獨立董事 (2024-2026)、中華民國電力電子協會理事長 (2016-2018) 、科技部電力學門召集人 (Jan. 2016- Dec. 2018) 、Editor, IEEE Journal of Emerging and Selected Topics in Power Electronics (IEEE JESTPE) (2019-2024) 、 Co-Editor-in-Chief, IEEE Trans. on Industrial Electronics, 2020-2023 、Committee Member, **IEEE Nikola Tesla Award** Committee, 2020-2022、AdCom member at Large (elected), IEEE Industrial Electronics Society (2011-2022)、台達年輕學者科技講座評審、東元獎評審、

Net Zero Tech International Contest 評審

學術榮譽：

- 國立臺北科技大學講座教授 (2013-2016, 2016-2019, 2019-2022, 2022-2025, 2025-2028)
- 國立臺北科技大學終身特聘教授 (2016-)
- 中華民國電力電子協會理事長 (2016-2018)
- 科技部電力學門召集人 (Jan. 2016- Dec. 2018)
- Editor, IEEE Journal of Emerging and Selected Topics in Power Electronics (IEEE JESTPE) (2019-2024)
- Co-Editor-in-Chief, IEEE Trans. on Industrial Electronics, 2020-2023
- Committee Member, IEEE Nikola Tesla Award Committee, 2020-2022
- AdCom Member at Large (elected), IEEE Industrial Electronics Society (2011-2022)
- 教育部學術獎「工程及應用科學」學術獎審查
- 電力電子協會『傑出貢獻獎』, 2021
- 教育部 第二屆 國家產學大師獎，2020
- 科技部電力學門卓越貢獻獎，2020
- 東元科技文教基金會東元獎 (科技類機械 / 材料 / 能源科技領域)，2019
- The 2018 Prize Paper Award, IEEE Journal of Emerging and Selected Topics in Power Electronics, 2019
- 科技部一零六年度傑出研究獎學術類，2018
- 台灣電力與能源工程協會學界傑出貢獻獎，2018.
- *IEEE FELLOW, J*an. 2014：For contributions to pulsewidth modulation techniques and motor drive systems
- 國立臺北科技大學傑出校友，Oct., 2013
- 國科會一零一年度傑出研究獎學術類，2013
- Best Paper Award, IEEE Power Electronics and Drive Systems, Japan, April, 2013

- Outstanding Paper Award, Intl. Conf. on Renewable Energy Research and Applications, Japan Nov. 2012
- 國科會 96 年技術移轉獎勵，Dec., 2007
- 教育部-東元電機產學合作績優計畫獎 ，Oct. 2004
- *Prize Paper Award*, *IEEE IAS Industrial Drives Committee*, 2003
- The Best Journal Paper Award, *John Hopkinson Premium*, *IEE*, UK, 1998

Selected Patents:

1. “Conversion system and conversion method,” Taiwan Patent TW 202612245 A, Mar. 16, 2026.
2. “Switching control system,” U.S. Patent 12,609,693 B2, Apr. 21, 2026.
3. “Planar transformer,” U.S. Patent Application US 2026/0148889 A1, May 28, 2026.
4. “Planar transformer,” U.S. Patent US 12,603,218 B2, Apr. 14, 2026.
5. "Conversion system and conversion method," U.S. Patent Application 18/959,961, Pub. No. US 2026/0081537 A1, Mar. 19, 2026.
6. 谐振变换装置与通用序列总线电路，中华人民共和国国家知识产权局发明专利 CN116526851A, Aug 01, 2023。
7. Resonance conversion device and universal series bus circuit, 美國發明專利 US20230238890A1, July 27, 2023.
8. 交流對直流升壓型轉換器切換控制方法，中華民國發明專利 I810081, July 21, 2023。
9. Planar Transformer. 美國發明專利 US20230094775A1, March 30, 2023.
10. 平板变压器，中华人民共和国国家知识产权局发明专利 CN115863016A, March 28, 2023。
11. 交流對直流升壓型轉換器切換控制方法，中華民國發明專利 I810081，Sep 30, 2022。
12. 变压器，中华人民共和国国家知识产权局发明专利 CN114203414A, March 18, 2022。
13. 平板绕组变压器，中华人民共和国国家知识产权局发明专利 CN114203408A, March 18, 2022。
14. Transformer. 美國發明專利 US20220084734A1, March 17, 2022.

15. Planar winding Transformer.美國發明專利 US20220084737A1, March 17, 2022.
16. 諧振變換裝置與通用序列匯流排電路，中華民國發明專利 I805201，Jan 24, 2022。
17. 平板繞組變壓器，中華民國發明專利 I747508, Nov. 21, 2021。
18. 平板變壓器，中華民國發明專利 I759247，Sep 24, 2021。
19. 變壓器，中華民國發明專利 I759242，Aug 16, 2021。
20. 馬達控制裝置及其直流鏈電壓控制方法，中華民國發明專利 I781548，Mar 8, 2021。
21. 伺服馬達驅動器裝置及其電流控制方法，中華民國發明專利 I717231，Jan. 21, 2021。

Selected Papers:

1. C. -A. Lai and Y. -S. Lai, “Data-Efficient Thermal Anomaly Detection Using Regime-Aware PCA with a Physically Interpretable Cooling Index,” in Proc. IEEE IAS Annual Meeting, Vancouver, BC, CANADA, 2026.
2. C. -J. Hsu, and Y. -S. Lai, “Rapid and Automated Current Trajectory Generation for EV IPM Drives Using Nonlinear Flux-Linkage Models,” in Proc. IEEE Energy Conversion Congress and Exposition (ECCE), Vancouver, BC, CANADA, 2026.
3. G. -J. Liao and Y. -S. Lai, "Novel Hybrid Soft-Switching Control for Four-Switch Buck-Boost Converter to Reduce Conduction Losses without Negative Current Detection Circuit and Delay," in Proc. IEEE Energy Conversion Congress and Exposition (ECCE), Vancouver, BC, CANADA, 2026.
4. C. -J. Hsu, Y. -C. Zhuo, Z. -H. Qiu and Y. -S. Lai, "An Auto Bandwidth Boost Tuning Method of Current Control for Servo Motor Drives Considering Time Delay," in IEEE Access, vol. 13, pp. 160103-160124, 2025.
5. Z. -H. Qiu and Y. -S. Lai, "Rapid Prototyping of Digital Twins Control System for IPM Drives Considering Both Saturation and Spatial Harmonics to Achieve Fast Development and Accurate Emulation," in IEEE Transactions on Industrial Electronics, vol. 72, no. 12, pp. 12231-12241, Dec. 2025.

6. Y. S. Lai, X. Y. Wu and Y. Y. Huang, “New Seamless Switching Control Technique between CCM and DCM for Boost PFC without Additional Zero Crossing Point Sensing Circuit,” IEEE Trans. On Industrial Electronics, Vol. 70, No. 1, pp. 12100 -12110, Oct. 2024.
7. Z. H. Qiu and Y. S. Lai, “New On-Line MTPA Angle Search and Control Methods Based on Digital Twins for IPM Synchronous Motor Drives Considering Motor Non-Linearity,” IEEE Access, Vol. 11, pp. 146185 – 146193, Dec. 8, 2023.
8. Y. Y. Huang and Y. S. Lai, “Optimal Inductor Design Method for GaN-Based PFC,” IEEE Access, Vol. 11, 2023.
9. C. K. Lin, C. A. Agustin, J. T. Yu, Y. S. Cheng, F. M. Chen, Y. S. Lai, “A Modulated Model-Free Predictive Current Control for Four-Switch Three-Phase Inverter-Fed SynRM Drive Systems,” IEEE Access, Dec. 6, 2021.
10. C. A. Agustin, J. T. Yu, Y. S. Cheng, C. K. Lin, H. Q. Huang, and Y. S. Lai, “Model-Free Predictive Current Control for SynRM Drives Based on Optimized Modulation of Triple-Voltage-Vector," IEEE Access, September 16, 2021.
11. W. S. Chen and Y. S. Lai, “Module-Based Laboratory Course for the Industry Sponsored Research and Design Master Program,” IEEE Access, July 12, 2021.
12. C. A. Agustin, J. T. Yu, C. K. Lin, J. Jai and Y. S. Lai, “Triple-Voltage-Vector Model-Free Predictive Current Control for Four-Switch Three-Phase Inverter-Fed SPMSM Based on Discrete-Space-Vector Modulation,” ” IEEE Access, April, 2021.
13. A. Lin, H. -Y. Chang and Y. -S. Lai, "New Matrix Transformer for High Efficiency and Slim Form-Factor Power Converters," 2025 International Future Energy Electronics Conference (IFEEC), Bali, Indonesia, 2025, pp. 202-207.
14. Y. -Y. Huang, Y. -S. Lai and S. -Y. Lai, "Optimized Inductor Design for MHz CrM Totem Pole PFC to Minimize Inductor Losses," 2025 International Future Energy Electronics Conference (IFEEC), Bali, Indonesia, 2025, pp. 83-88.

15. Y. -S. Lai, Y. -H. Su and S. -Y. Lai, "Seamless Transition Switching Control Technique Between DCM and CCM for Four-Switch Buck-Boost DC-DC Converters," 2025 International Future Energy Electronics Conference (IFEEC), Bali, Indonesia, 2025, pp. 196-201.
16. C. -Y. Chen and Y. -S. Lai, "Seamless Mode Transition Method Considering Voltage-Second Balance of Magnetic Component Between Transition to Reduce the Voltage Stress for Wide Output Voltage Range of Full Bridge Resonant Converter," 2025 International Future Energy Electronics Conference (IFEEC), Bali, Indonesia, 2025, pp. 148-153.
17. Y. Y. Huang, Y. S. Lai, S. Y. Ou and C. P. Chang, “Switching Instants Optimization for MHz CrM Totem-Pole PFC without Real-Time Calculations,” Nov. 9-13, ICRERA, Nagasaki, 2024.
18. Z. H. Quiu, Y. S. Lai, C. J. Hsu, W. M. Chiou and S. H. Lai, “Rapid Development Framework of Motor Control Technology for IPM Synchronous Motor Drivers Based on Multi-verification In the Loop,” IEEE IECON, Nov. 3-6, Chicago, 2024.
19. C. J. Hsu, Y. S. Lai, Z. H. Quiu and P. Y. Lin, “New ECE Motor Model Considering Tolerance of Manufacturing and Material for High Speed Application Under Field Weakening Control,” IEEE IECON, Nov. 3-6, Chicago, 2024.
20. Y. S. Lai, X. Y. Wu and Y. Y. Huang, “Novel Continuous Transition of CCM and DCM Switching Control Method for Efficiency Improvement of PFC,” Nov. 20-23, IEEE IFEEC 2023.
21. K. W. Wang, Z. H. Qiu, C. J. Hsu and Y. S. Lai, "Optimum On-Line DC-Link Voltage Regulation for Efficiency Improvement of Motor Drives," IECON 2022 – 48th Annual Conference of the IEEE Industrial Electronics Society, 2022.
22. Y. Y. Huang and Y. S. Lai, “Novel Efficiency Optimized Inductor Design for GaN-Based Totem-Pole PFC,” IEEE ISIE, 2022.
23. C. Y. Li and Y. S. Lai, “Novel Hybrid Switching Control Technique for Light Load Efficiency Improvement of GaN-based Totem Pole Power Factor Corrector”, IEEE ISIE, 2022.

24. Y. C. Zhuo, C. J. Hsu, Z. H. Qiu, Y. S. Lai, “Bandwidth Boost Method of Current Control for Servo Motor Drives with Current Observer,” Nov. 16-19, IEEE IFEEC 2021.
25. W. S. Chen and Y. S. Lai, “New Module-Based Laboratory Course Design for Power Electronics,” Nov. 16-19, IEEE IFEEC 2021.