

Expertise

Power Electronics, Digital Power Management

Education

- Ph. D, Department of Electrical, Computer and Energy Engineering** May. 2010
University of Colorado, Boulder, CO (adviser: *Dragan Maksimovic*)
(Thesis title: Digital Control Techniques for Efficiency Improvements in Single-Phase Boost Power Factor Correction Rectifiers)
- M. S. degree, Department of Electrical & Computer Engineering** Dec. 2003
State University of New York at Stony Brook, Stony Brook, NY
- B. S. degree, Department of Mechanical and Marine Engineering** Jun. 1999
National Taiwan Ocean University, Keelung, Taiwan

Employment

- Assistant Professor, National Kaohsiung Univ. of Science and Technology, Kaohsiung** Feb. 2018–
 - Teaching in power converter related courses.
 - Research on power electronics related fields.
 - Supervise Power Electronics Application Lab
- Assistant Professor, National Kaohsiung Univ. of Applied Sciences, Kaohsiung** Aug. 2016–Jan. 2018
 - Operating of Power Management and System Control Lab.
- Associate Director, Southern Taiwan Teaching/Learning Resource Center, Kaohsiung** Jan. 2017–Feb. 2018
 - Planning and coordinating administrative events.
- Engineer, Industrial Technology Research Institute, Tainan** Mar. 2013–Jul. 2016
 - Development of driver circuits for high power laser source.
 - Design temperature regulation circuits / system design.
 - Measurement automation for industrial applications.
- Control Engineer, Taiwan Power Company, Taichung** Nov. 2012–Mar. 2013
 - Power plant instrument & measurement design document review.
- Engineer/Section Manager, Delta Electronics, Tainan** Sep. 2010–Nov. 2012
 - Management on Japanese product lines (maintained and new products)
 - Multiple strings DC-AC isolated solar inverters.
 - Single/Multiple strings DC-AC non-isolated solar inverter.
- IC Design Intern, Cirrus Logic Inc., Austin, TX** Sep. 2008–Dec. 2008
 - Development of new current control algorithm based on current error estimator.
 - Top level simulation for AC-DC power factor correction (PFC) controller.
- Research Assistant, Colorado Power Electronics Center (CoPEC), Boulder, CO** May 2005–Jul. 2010
 - Research on high efficiency digital control algorithm for PFC rectifier over wide load range. (sponsored by **Cirrus Logic Inc.**)
 - Research on controller design for SiC integrated circuit from top level to transistor level. (sponsored by **General Electric**)
- Teaching Assistant, ECEE Dept., University of Colorado, Boulder, CO** Jan. 2008–May 2008
 - Power Electronics and Photovoltaic Power Systems Laboratory, including PV system, peak power tracker, isolated step-up converter, inverter related lab sections.

Research / Development Projects

- A Differential Power Processing Photovoltaic System Using Series Parallel Modules** 2024-2025
Principal Investigator / project sponsored by NSTC 113-2221-E-992-083 - / \$805K
- Development of Micro PMU and Edge Computing Techniques to Support Renewable-Rich Power System Monitoring and Operation (2/2)** 2024-2025
Co-Principal Investigator / project sponsored by NSTC 113-2218-E-992-003 - / \$8.4M
(P.I.: Chun-Lien Su / Co-P.I.: Chia-Hung Lin, Chien-Erh Weng, Te-Tien Ku, Tung-Sheng Zhan, Kuo-Yuan Lo, Mahmoud Elsis)
- Efficiency Improvement on Bidirectional Non-Inverting Buck Boost Converter** 2023-2024

Principal Investigator / project sponsored by NSTC 112-2221-E-992-010 - / \$662K Development of Micro PMU and Edge Computing Techniques to Support Renewable-Rich Power System Monitoring and Operation (1/2)	
Co-Principal Investigator / project sponsored by NSTC 112-2218-E-992-005 - / \$5M (P.I.: Chun-Lien Su / Co-P.I.: Chia-Hung Lin, Chien-Erh Weng, Te-Tien Ku, Tung-Sheng Zhan, Kuo-Yuan Lo、Mahmoud Elsis)	2023-2024
Research and Development on Automotive Cooling Fan Drivers	
Principal Investigator / project sponsored by Tong Yang Industry / \$786K (Co-P.I.: Horng-Yuan Wu)	2021-2022
Design and Implementation of a Self-Driving Electrical Boat for Box Net Farming in Ocean	
Co-Principal Investigator / project sponsored by NKUST / \$1.2M (P.I.: Kuo-Yang Tu / Co-P.I.: Cheng-Yu Lu)	2021-2022
The development of charging circuits for specific battery modules – 12Watt	
Co-Principal Investigator / project sponsored by MicroMED Co Ltd / \$150K (P.I.: Jiunn-Ru Lai)	2021
The development of charging circuits for high-power specific supercapacitor modules	
Co-Principal Investigator / project sponsored by MicroMED Co Ltd / \$150K (P.I.: Jiunn-Ru Lai)	2021
Bidirectional Non-Inverting Buck-Boost Converter on Cascade System	
Principal Investigator / project sponsored by MOST 109-2221-E-992-047 - / \$649K	2020-2021
Single-Voltage-Sensor Maximum Power Point Tracker on Grid-Tied Cascade Photovoltaic System	
Principal Investigator / project sponsored by MOST 108-2221-E-992-042 - / \$767K	2019-2020
Comparator Based Digitally Power Factor Correction Rectifier	
Principal Investigator / project sponsored by MOST 107-2221-E-992-013 - / \$701K	2018-2019
High Efficiency Synchronous Pulse Laser Driver System (II)	
Principal Investigator / project sponsored by MOST 106-2221-E-992-346 - / \$578K	2017-2018
High Efficiency Synchronous Pulse Laser Driver System	
Principal Investigator / project sponsored by MOST 105-2218-E-151-004 - / \$747K	2016-2017
Other Projects (*Principal Investigator)	
2023 Taiwan ICDF Vocational Training project for Latin America and the Caribbean —Electric Vehicle Operation and Maintenance Training Course, NKUST, Kaohsiung, Taiwan	2023
Southern Taiwan Science Park Talent Development Program, NKUST, Kaohsiung, Taiwan	2022-2023
New Engineering Education Method Experiment and Construction (NEEMEC) Project-A Class, NKUST, Kaohsiung, Taiwan	2021-2022
New Engineering Education Method Experiment and Construction (NEEMEC) Project-B Class, NKUST, Kaohsiung, Taiwan	2020-2021
Energy Establishment and Test Analysis of State Ship State-made Lithium Battery Type Approval, NKUST, Kaohsiung, Taiwan	2021-2024
Certificate Training Courses -iPAS Electrical Vehicle Mechatronics Engineering Training Course-Entry Level, NKUST, Kaohsiung, Taiwan *	2019-2024
iPAS Southern District Industrial Elite Training Base and Practical Examination Center Construction and Maintenance Plan, NKUST, Kaohsiung, Taiwan	2018-2020
Project for Commissioning Skills Assessment Module for Junior Electric Vehicle Electromechanical Integration Engineers, NKUST, Kaohsiung, Taiwan *	2019
Electric Vehicle Engineering Education Experimental Community, NKUST, Kaohsiung, Taiwan * (2019 NKUST Best Professional Learning Community.)	2019
Laser-Enhanced Surface Optical Material Inspection Technology, ITRI, Tainan, Taiwan	2016-2017
Automotive Electronics Testing Automation System, ITRI, Tainan, Taiwan *	2015-2016
Continuous-Wave Laser (500W), ITRI, Tainan, Taiwan	2015-2016
TEC Temperature Regulation Panel, ITRI, Tainan, Taiwan *	2014-2015
Nano-Second Pulsed Laser (20W/30W/50W), ITRI, Tainan, Taiwan	2013-2015
Bearing Ball Surface Imperfection Measurement, ITRI, Tainan, Taiwan	2013-2014
DC/AC LED Junction Temperature Measurement, ITRI, Tainan, Taiwan	2013-2014
Multiple-String Grid-Tied Non-Isolated Solar Inverter (JH-40/35CB2), Delta, Tainan, Taiwan*	2011-2012
Grid-Tied Non-Isolated Solar Inverter (TL-4k), Delta, Tainan, Taiwan*	2011-2012
Multiple-String Grid-Tied Isolated Solar Inverter (JH-M0B2), Delta, Tainan, Taiwan	2010-2011

Digital Control for Power Factor Correction Rectifier, CoPEC, Boulder, CO	2007-2010
Planar Integrated Power Processing, CoPEC, Boulder, CO	2005-2007
Real-Time Operated DSP, Digital Signal Processing Lab, SUNY-SB, Stony Brook, NY	2002-2003
Tendon Driven Manipulator, Servo-Mechanical Lab, NTOU, Keelung, Taiwan	1999

Journal Publications (*Corresponding Author)

- [1] J.-C. Wu, H.-L. Jou, **F. Chen***, and H.-X. Huang, "Seven-Level Dual-Buck Inverter for Photovoltaic Power Generation," in *IET Renewable Power Generation*, [Accepted], doi:10.1049/rpg2.13066.
- [2] **F. Chen***, H.-L. Jou, J.-C. Wu, H.-C. Hung and J.-Y. Luo, "An Online Maximum Efficiency Point Tracking Technique for Bidirectional Noninverting Buck-Boost Converter over Wide Power Range," in *IEEE Trans. Power Electron.*, vol. 39, no. 7, pp. 7995 – 8006, Jul. 2024, doi: 10.1109/TPEL.2024.3386795.
- [3] J.-C. Wu, **F. Chen**, H.-L. Jou and Y.-T. Chen, "A Grid-Connected Eleven-Level Power Conversion Interface," in *International Journal of Electronics*, pp. 1–19, 2024, doi: 10.1080/00207217.2024.2354063.
- [4] J.-C. Wu, H.-L. Jou, **F. Chen** and J.-P. Li, "Cascaded AC-DC Power Conversion Interface for Charging Battery," in *Electronics*, vol. 12, no. 5, pp. 1192, Mar. 2023, doi: 10.3390/electronics12051192.
- [5] H.-L. Jou, **F. Chen***, J.-C. Wu, C.-C. Chiang, L.-W. Su and W.-T. Chen, "A New Modulation Strategy on Isolated Battery Charger with Wide Input and Output Voltage Range," in *IET Power Electron.*, Vol. 16, no. 8, pp. 1355 – 1366, Jun. 2023, doi: 10.1049/pe12.12474
- [6] **F. Chen***, Y. Song and F. Ho, "An Efficiency Improvement Driver for Master Oscillator Power Amplifier Pulsed Laser Systems," in *Processes*, vol. 10, no. 6, pp. 1197, Jun. 2022, doi: doi.org/10.3390/pr10061197.
- [7] M. A. Hassan, C.-L. Su, **F. Chen** and K.-Y. Lo, "Adaptive Passivity-Based Control of DC-DC Boost Power Converter Supplying Constant Power and Constant Voltage Loads," in *IEEE Trans. Industrial Electron.*, vol. 69, no. 6, pp. 6204 – 6214, Jun. 2022, doi: 10.1109/TIE.2021.3086723.
- [8] **F. Chen*** and D. Maksimovic, "Digital Control for Improved Efficiency and Reduced Harmonic Distortion over Wide Load Range in Boost PFC Rectifiers," in *IEEE Trans. Power Electron.*, vol. 25, no. 10, pp. 2683 – 2692, Oct. 2010, doi: 10.1109/TPEL.2010.2050702.

Other Publications

- [9] Y. Fan and **F. Chen**, "A Comparator Based Digitally Controlled Power Factor Correction Rectifier," in *Proc. IEEE International Conference on Electrical, Computer and Energy Technologies*, 2024.
- [10] 李尚益、吳晉昌、周宏亮、**陳附仁**，"具可變結構之直流-直流升壓轉換器"，第44屆中華民國電力工程研討會暨第20屆台灣電力電子研討會，2023。
- [11] 陳威廷、周宏亮、**陳附仁**、吳晉昌，"新型寬輸出直流電壓範圍隔離型直流-直流電能轉換器之研究"，第44屆中華民國電力工程研討會暨第20屆台灣電力電子研討會，2023。
- [12] 陳建禎、吳柏霖、**陳附仁**、周宏亮，"單一電壓量測最大功率追蹤法之解析度研究-用於疊接式太陽能系統"，第43屆中華民國電力工程研討會暨第19屆台灣電力電子研討會，2022。
- [13] 周宏亮、吳晉昌、**陳附仁**、陳弘文，"新型寬電壓範圍隔離型充電器之研究"，第43屆中華民國電力工程研討會暨第19屆台灣電力電子研討會，2022。
- [14] J. Luo and **F. Chen**, "Wild Load Range Operation for Bidirectional Non-Inverting Buck Boost Converter." in *Proc. IEEE International Future Energy Electronics Conference*, 2021, pp. 1 – 6, doi: 10.1109/IFEEEC53238.2021.9662032.
- [15] 李奕頡、方景田、**陳附仁**、吳鴻源，"具成本效益的車用之無感測器直流無刷馬達控制器研製"，第42屆中華民國電力工程研討會暨第18屆台灣電力電子研討會，2021。
- [16] 方景田、李奕頡、**陳附仁**、吳鴻源，"數位高降壓具箝位電路之改善型抽頭式電感降壓轉換器"，第42屆中華民國電力工程研討會暨第18屆台灣電力電子研討會，2021。
- [17] 張簡明軒、**陳附仁**、吳致賢，"單一電壓量測之最大功率追蹤用於疊接式太陽能系統"，第41屆中華民國電力工程研討會暨第17屆台灣電力電子研討會，2020。
- [18] 范揚典、**陳附仁**，"比較器實現之數位功率因數校正整流器"，第40屆中華民國電力工程研討會暨第16屆台灣電力電子研討會，2019。
- [19] **F. Chen**, F. Ho, C. Yang, Y. Song and Y. Jhang, "CONTROL METHOD FOR SPEEDING UP LIGHT EMITTING OF LASER DIODE," Taiwan Patent No. I575829.
- [20] **F. Chen**, Y. Song, H. Tsai and C. Chen, "LASER DRIVER MODULE AND CONTROL METHOD THEREOF," Taiwan Patent No. I603556.
- [21] Y. Jhang, **F. Chen** and S. Lin, "LASER PROCESS APPARATUS AND METHOD THEREOF," Taiwan Patent No. I607820.
- [22] **F. Chen**, J. Wang, Y. Song, and F. Ho, "High Efficiency Synchronous Pulse Laser Driver System." in *Proc. IEEE International Future Energy Electronics Conference*, 2017, pp. 1878 – 1881, doi:

10.1109/IFEEC.2017.7992335.

- [23] **F. Chen** and D. Maksimovic, "Digital Control for Improved Efficiency in Interleaved Boost PFC Rectifiers." in *Proc. IEEE Applied Power Electronics Conference and Exposition*, 2010, pp. 188 – 195, doi: 10.1109/APEC.2010.5433671.
- [24] **F. Chen** and D. Maksimovic, "Digital Control for Improved Efficiency and Reduced Harmonic Distortion over Wide Load Range in Boost PFC Rectifiers." in *Proc. IEEE Applied Power Electronics Conference and Exposition*, 2009, pp.760 – 766, doi: 10.1109/APEC.2009.4802747.

Courses / Teaching

Solid-State Power Supplies / undergraduate	Fall	2016
Solid-State Power Converters / graduate	Fall	2016, 2018, 2023
Electrical Machinery / undergraduate	Spring	2017-2022
Power Electronics Analysis and Practice / undergraduate	Spring	2017-2019, 2021-2022
Electrical Machinery II / undergraduate	Fall	2017
Static Solid Motor Drive / undergraduate	Spring	2018-2019
Power Electronics / undergraduate	Fall	2018-2023
Electric Machinery Experiments / undergraduate	Fall	2018-2021
Electric Vehicle Motor Drive / undergraduate	Spring	2020
Electric Vehicle Motor Drive Laboratory / undergraduate	Fall	2020-2022
Switched Mode Power Conversion Analysis / graduate / EMI	Spring	2021-2022
Switched Mode Power Modeling and Simulation / graduate / EMI	Fall	2021
Electronics I / undergraduate	Fall	2022-2023
Electronics Practice I / undergraduate	Fall	2022-2023
Electronics II / undergraduate	Spring	2023-2024
Electronics Practice II / undergraduate	Spring	2023-2024
Digital Power Laboratory / graduate	Spring	2023-2024
iPAS Electrical Vehicle Mechatronics Engineering Training Course	Spring	2019-2024
ICDF Vocational Training project for Latin America and the Caribbean —Electric Vehicle Operation and Maintenance Training Course	Summer	2023

Students Supervision

Wei-Zhe Lu M.S. / 2024	An Integrated Bridgeless Power Factor Correction Rectifier Single-Stage Resonant Wireless Power Transfer Converter
Wei-Ting Chen M.S. / 2024	Study and Implementation of New Bidirectional Isolated DC-DC Power Converter with Wide Voltage Range Based on Three-Port Converter
Bo-Pei Wu M.S. / 2024	A Photovoltaic System Using Stacked Series Parallel Differential Power Processing
Hao-Che Hung M.S. / 2023	An Online Efficiency Optimization Technique by Adjusting Drive Signal Phase for Wide Load Range Operated Non-Inverting Buck-Boost Converters
Jun-Yao Luo M.S. / 2022	Bidirectional Non-Inverting Buck-Boost Converter on Cascade System
Jian-Zhen Chen M.S. / 2022	Study of Dithering in Single-Voltage-Sensor Maximum Power Point Tracker on Cascade Photovoltaic System
Chih-Hsien Wu M.S. / 2021	Development of Field-Oriented Controlled Driver for Permanent-Magnet Synchronous Motor
Feng-Ming Pan M.S. / 2021	A Bidirectional DC-DC Converter For Low Voltage Applications
Ming-Shiuan Jang Jian M.S. / 2020	Single-Voltage-Sensor Maximum Power Point Tracker on Cascade Photovoltaic System
Yang-Dian Fan M.S. / 2019	Comparator Implemented Digital Power Factor Correction Rectifier

Certificates and Honors

Excellent Internship Tutor- National Kaohsiung Univ. of Science and Technology	2024
Cambridge English-Certificate in EMI skills- English as a Medium of Instruction	2022
Excellent Tutor- College of Electrical Engineering and Computer Science	2022
Excellent Tutor- Department of Electrical Engineering	2022

MOEA Certified Electric Vehicle Mechatronics Engineer – Specialist Level (Certified No. A-E21-0081-2020)	2020
Excellent Tutor- College of Electrical Engineering and Computer Science	2020
Excellent Tutor- Department of Electrical Engineering	2020

Activities

Addresser, “Virtual Synchronous Generator Techniques”, Taiwan Power Research Institute Taiwan Power Company.	2024
Addresser, “Battery Chargers for Electric Vehicle”, International Cooperation and Development Fund.	2024
Examinations Review Committee, MOEA Certified Electric Vehicle Mechatronics Engineer – Specialist Level, National Formosa University.	2023
Addresser, “Comparator Based Digital Power Process”, IEEE Power Electronics Society-Taipei Chapter.	2022
Examinations Review Committee, MOEA Certified Electric Vehicle Mechatronics Engineer – Specialist Level, National Formosa University.	2021
Addresser, “Digital Power Design Flow”, National Formosa University.	2015
Addresser, “My Experience on National/Private Companies”, National Formosa University.	2014

Services

Section Chair, 中華民國電力工程研討會暨台灣電力電子研討會.	
Reviewer, <i>IEEE Transactions on Vehicular Technology</i> .	
Reviewer, <i>IEEE Transactions on Power Electronics</i> .	
Reviewer, <i>IEEE Transactions on Industrial Applications</i> .	
Reviewer, <i>IEEE Transactions on Circuits and System II</i> .	
Reviewer, 遠東學報.	
Reviewer, <i>Applied power electronics conference and export</i> .	
Reviewer, 中華民國電力工程研討會暨台灣電力電子研討會.	
Graduate Program Thesis Oral Exam Committee Member, Hong-Wen Chen, National Kaohsiung Univ. of Science and Technology, 2023	
Graduate Program Thesis Oral Exam Committee Member, Sheng-Bao Lin, National Kaohsiung Univ. of Science and Technology, 2023	
Graduate Program Thesis Oral Exam Committee Member, Han-Xin Huang, National Kaohsiung Univ. of Science and Technology, 2023	
Graduate Program Thesis Oral Exam Committee Member, Jia-Kai Hsieh, National Kaohsiung Univ. of Science and Technology, 2023	
Graduate Program Thesis Oral Exam Committee Member, Chia-Wei Lee, National Chung Hsing University, 2022	
Graduate Program Thesis Oral Exam Committee Member, Chun-Hsien Lu, National Chung Hsing University, 2022	
Graduate Program Thesis Oral Exam Committee Member, Chung-Yang Wu, National Chung Hsing University, 2022	
Graduate Program Thesis Oral Exam Committee Member, Shih-Hung Chiu, National Chung Hsing University, 2022	
Graduate Program Thesis Oral Exam Committee Member, Wei-Chen Wu, National Kaohsiung Univ. of Science and Technology, 2022	
Graduate Program Thesis Oral Exam Committee Member, Tai-Yi Li, National Kaohsiung Univ. of Science and Technology, 2022	
Graduate Program Thesis Oral Exam Committee Member, You-You Yeh, National Kaohsiung Univ. of Science and Technology, 2022	
Graduate Program Thesis Oral Exam Committee Member, Shin-Yue Chen, National Kaohsiung Univ. of Science and Technology, 2022	
Graduate Program Thesis Oral Exam Committee Member, Jing-Ye Lin, National Kaohsiung Univ. of Science and Technology, 2021	
Graduate Program Thesis Oral Exam Committee Member, You-Xuan Guo, National Kaohsiung Univ. of Science and Technology, 2021	
Graduate Program Thesis Oral Exam Committee Member, Jui-Ping Yang, National Kaohsiung Univ. of Science and Technology, 2021	
Graduate Program Thesis Oral Exam Committee Member, Wei-Yu Wang, National	

Kaohsiung Univ. of Science and Technology, 2020

Graduate Program Thesis Oral Exam Committee Member, Jia-Hao Guo, National Kaohsiung Univ. of Science and Technology, 2020

Graduate Program Thesis Oral Exam Committee Member, Yun-Hsuan Chang, National Kaohsiung Univ. of Science and Technology, 2020

Graduate Program Thesis Oral Exam Committee Member, Dong-Jhen Lin, National Kaohsiung Univ. of Science and Technology, 2020

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