

Zhen Ding and NTHU Showcase Outstanding R&D Capabilities in Industry-Academia Collaboration

Smart Manufacturing Research Results Featured at Top IEEE International Conference

Zhen Ding Technology Group (TWSE: 4958), the global leader in the PCB industry, together with National Tsing Hua University (NTHU), has achieved fruitful results in their joint industry-academia research. Five smart manufacturing academic papers have been selected for presentation at the 22nd IEEE International Conference on Automation Science and Engineering (IEEE CASE 2026), to be held in Shenyang from August 17 to 21. IEEE CASE is a top-tier international academic conference in the fields of intelligence and automation science, enjoying high global prestige. This achievement not only demonstrates Zhen Ding's long-term investment in frontier technology R&D but also lays a solid theoretical foundation and technical platform for Zhen Ding Group's digital transformation and global layout of smart factories.

The "Zhen-Ding & NTHU Joint Research Center" was established on June 18, 2020, through an agreement signed by Charles Shen, Chairman of Zhen Ding, and Hong Hocheng, then President of NTHU. Focusing on PCB smart manufacturing and advanced process technologies, the center has now entered its second five-year phase. It continues to deepen AI-empowered smart manufacturing technologies and high-end IC substrate R&D, enhancing supply chain resilience and promoting heterogeneous integration, with total R&D funding exceeding NT\$100 million across the two phases.

Charles Shen, Chairman of Zhen Ding, stated that these fruitful results are attributed to the deep collaboration between NTHU faculty and students and Zhen Ding colleagues, providing a solid academic foundation and technical backbone for Zhen Ding to drive smart manufacturing and sustainable development. Upholding its corporate social responsibility, Zhen Ding will continue to cultivate future high-end PCB and semiconductor talent through industry-academia cooperation and scholarship programs, accelerating digital transformation and innovative development in advanced manufacturing technologies across the PCB industry.

The theme of IEEE CASE 2026 is "Smart Industry." Yu-Chieh Huang, Head of Zhen Ding's Intelligent Technology R&D and Translation Center, chaired the special session on "Smart Manufacturing and Excellence Manufacturing Intelligent Solutions for PCB and Semiconductors." This session covered five joint research outcomes, including: production line key process optimization, smart logistics scheduling optimization, supply chain resilience and raw material risk decision-making, as well as AI intelligent

management—providing scalable smart solutions under high-mix, low-volume production environments to facilitate heterogeneous integration across the upstream and downstream PCB and semiconductor sectors.

Dr. Chen-Fu Chien, Director of the Zhen-Ding & NTHU Joint Research Center and President of Zhen Ding, noted that the center focuses on market trends, industry technology frontiers, and forward-looking pain points. Through industry-academia research projects, it provides mechanisms such as research funding, factory visits, summer internships, smart manufacturing lectures, co-supervision by industry experts, and student paper awards. This has established a comprehensive and sustainable long-term win-win collaboration, enabling the research team to make academic contributions, generate industrial value, and gain tangible rewards, while reserving key strategic talent for the new high-growth cycle of the PCB and semiconductor industries. Long-cultivated in the innovative technology of "AI-empowered heterogeneous integration to optimize productivity," the center's achievements have been recognized with the 2026 Future Tech Award by the National Science and Technology Council (NSTC).

Among the results presented at the conference, the paper titled "Online Hierarchical RF Signal Anomaly Detection and Localization Technology," presented by Chen-Yi Kuo, a master's student in the Department of Industrial Engineering and Engineering Management at NTHU, was particularly outstanding. Directly targeting "Advanced Process Control (APC) technology in the semiconductor industry, this research developed an ensemble learning AI system integrating multi-models. Combining two core mechanisms—"multi-scale partitioning" and "weighted voting"—along with AI agents, the system can automatically filter defects in seconds and accurately locate abnormal frequencies. This replaces tedious and time-consuming manual analysis, significantly improving anomaly diagnosis resolution and production efficiency in smart factories. Co-guided by Zhen Ding's industry experts, this technology—possessing both academic and industrial value—was fully honed in actual production environments and has been validated and deployed online. Student Chen-Yi Kuo has also joined Zhen Ding, serving as an ideal example of co-creating through industry-academia collaboration to cultivate high-potential strategic talent.



▲ Zhen Ding Chairman Charles Shen (left) signed an agreement with then NTHU President Hong Hocheng to establish the "Zhen-Ding & NTHU Joint Research Center," which has now entered its second five-year phase.

About Zhen Ding Technology Holding Limited

Zhen Ding Technology Holding Limited (Taiwan Stock Exchange: 4958) specializes in the research, development, production, and sales of a diversified range of products, including flexible printed circuit board (FPC) and surface mount assembly (SMA), substrate-like PCBs (SLP), high-density interconnect (HDI) PCBs, high-layer-count and high-density (HLC-HDI) boards, multilayer rigid printed circuit boards (RPCB) and IC substrates (ICS). These products are widely used in end products such as computer information, consumer electronics, communications networks, automotive electronics, AI server high-speed computing, optical module and medical applications. The company offers professional one-stop shopping, full-solution services to customer worldwide. According to Prismark's global PCB industry rankings by revenue, Zhen Ding has been ranked the world's largest PCB manufacturer for nine consecutive years, from 2017 to 2025. For more detailed information, please visit the company website: www.zdtco.com.

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