# TING-LUN SU

Intelligent Automation Engineer

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## EDUCATION

**Bachelor of Science in Intelligent Automation Engineering**
National Chin-Yi University of Technology (NCUT), Taichung, Taiwan
June 2022 - Present

*Research Focus:* AI-driven robotics, intelligent manufacturing, computer vision, and industrial automation systems. Active participation in multiple industry-academia collaborative research projects.

## RESEARCH INTERESTS

- Intelligent Manufacturing & Industry 4.0
- AI-Driven Robotic Systems & Path Optimization
- Computer Vision for Quality Inspection
- Large Language Models (LLM) & Multi-modal AI Applications
- Human-Robot Collaboration & Smart Automation Systems

## PUBLICATIONS

### Journal Articles

[1] **T.-L. Su**, P.-J. Chen, T.-J. Peng, and C.-C. Lin, "Automated spray path planning based on Bayesian optimization and ant colony optimization," *The International Journal of Advanced Manufacturing Technology*, vol. 139, pp. 5491-5509, August 2025. DOI: 10.1007/s00170-025-16162-x
[*SCI-indexed, Q2, Impact Factor: 2.9*]

[2] T.-J. Peng, P.-J. Chen, **T.-L. Su**, and C.-C. Lin, "Optimization of Automated Forging Release Agent Spray Path Based on Ant Colony Algorithm," *Journal of Automation Intelligence and Robotics*, Taiwan Automation Intelligence and Robotics Association (TAIROA), No. 51, pp. 114-120, December 2024.

### Conference Proceedings

[3] Z.-L. Sun, T.-S. Liaw, C.-L. Liu, **T.-L. Su**, C.-C. Wang, and T.-J. Peng, "Green Machining Optimization and Burr Treatment in Mill-Turn Operations," in *Proceedings of the 27th Annual Meeting of the Chinese Society of Mechanism and Machine Theory (CSMMT)*, November 2024, Abstract No. 039.

[4] **T.-L. Su**, C.-H. Du, and C.-H. Lai, "Development of a Contactless AIoT Smart Data Management Hybrid Vending System," in *Proceedings of The 17th Intelligent Living Technology Conference (ILT)*, June 2023, Paper No. 3C009.

[5] **T.-L. Su**, Q.-L. Liu, Y.-H. Lin, and C.-H. Lai, "The function analysis of green electric automatic weeder," in *Proceedings of Conference on Green Technology Engineering and Applications (GTEA)*, May 2023, Paper No. GEES012, pp. 214.

## PATENTS

**Invention Patent:** Mushroom Stem Cutting Machine. Taiwan Patent No. I891383, granted May 2025.
*An automated device designed to precisely cut mushroom stems, improving efficiency and consistency in agricultural processing.*

**Utility Model Patent:** Mushroom Stem Cutting Machine. Taiwan Patent No. M659734, granted August 2024.
*A mechanical design enhancing the stability and cutting performance of the mushroom stem processing system.*

## RESEARCH & PROFESSIONAL EXPERIENCE

### Industry-Academia Collaboration Projects

**Visual Measurement Inspection Station and Generative AI Navigation System**
TURVO INTERNATIONAL CO., LTD., Taichung, Taiwan
*2025 - Present*

• Lead project planning, technical design, and stakeholder communication

• Developed AI-powered software integrating LLM and Model Context Protocol (MCP)

• Focus on intelligent quality inspection and navigation assistance systems

**Smart CNC Flexible Manufacturing Factory (Three-Phase Project)**
IC STAR INDUSTRIAL CO., LTD., Taichung, Taiwan
*2024 - 2025*

• Led 42-member cross-disciplinary team in redesigning Plant A and constructing Plant B

• Deployed 20 CNC machines and 10 robotic arms with complete system integration

• Achieved 80% manpower reduction and significantly enhanced automation efficiency

• Managed robotics, CNC communication, hardware-software integration, and control design

**Automated Robot Arm Forging Spraying System with AI Path Generation**
IC STAR INDUSTRIAL CO., LTD., Changhua, Taiwan
*2023 - 2024*

• Led AI-based ant colony optimization planning and robotic control implementation

• Achieved 27% production increase, 91% defect reduction, and 21% cost savings

• Enabled flexible line switching with 83% shorter setup time and 97.3% trajectory accuracy

• Deployed across three automated forging production lines

**Automatic CNC Chip Entanglement Detection System**
Industrial Technology Research Institute (ITRI), Taichung, Taiwan
*2023*

• Developed AI-based YOLO vision system for real-time chip entanglement detection

• Implemented in unmanned smart manufacturing lines

• Reduced rework and maintenance costs while improving automation efficiency

**Development and Commercialization of Automatic Mushroom Stem-Cutting System**
University Social Responsibility (USR) Project, Xinshe, Taiwan
*2022 - Present*

• Successfully commercialized smart mushroom stem-cutting machine

• Adopted by three manufacturers, improving local agricultural industry efficiency

• Granted two patents for pressing and auto-sorting mechanisms

**3D Vision-Guided Picking and Robotic System Integration**
LIEBHERR-Verzahntechnik GmbH & PONGI Gear Expert CO., LTD., Taichung, Taiwan
*2022 - Present*

• Integrated and optimized Liebherr LHRobotics.Vision random picking system

• Developed 3D vision-guided robotic coordination for enhanced precision

• Provided technical support for client implementation and troubleshooting

## CONFERENCE PRESENTATIONS & EXHIBITIONS

• **2025 Taipei USR EXPO**, September 2025. Presented smart mushroom stem-cutting system demonstrating sustainable agricultural automation and AI-based control.

• **2024 Taipei International Automation Exhibition**, August 2024. Showcased AI Automated Robot Arm Forging Spraying System and initiated industry collaboration.

## HONORS & AWARDS

### Academic Years 2022-2025

• Second Place, National Vocational and Technical College Student Practical Project Competition, 2025

• First Place, Intelligent Automation Equipment Invention Awards (13th Edition), 2024

• Third Place, Taiwan Society of Precision Engineering's 113th Project and Paper Award, 2024

• Honorable Mention, Mitsubishi Electric Contest of Automation (1st Edition), 2024

• Honorable Mention, Mitsubishi Electric CNC Smart App Creative Development Competition, 2024

• Science and Technology Humanities Award, 27th TDK Cup National Collegiate Creative Design Competition, 2023

### Early Achievements (2020-2022)

• 3 Gold Medals, 2 Silver Medals, and 4 Honorable Mentions in National Project and Science Fair Competitions

## PROFESSIONAL CERTIFICATIONS

• Photovoltaic System Installation - Licensed Technician Class B, Ministry of Labor (WDA)

• AI Application Planner - Licensed Technician, Ministry of Economic Affairs (iPAS)

• Industrial Wiring - Licensed Technician Class C, Ministry of Labor (WDA)

• Commercial Wiring - Licensed Technician Class C, Ministry of Labor (WDA)

• Master of Computer Certificate - Class C, Chinese Computer Education Association

## INTERNATIONAL ACADEMIC EXCHANGE

**SAKURA SCIENCE Exchange Program**, 2024
Japan Science and Technology Agency (JST)
Suwa University of Science, Nagano, Japan
Host: Professor Masahide Oshima (Vice President)

## TECHNICAL SKILLS

• **Programming Languages:** Python, C#, C++, MATLAB

• **Artificial Intelligence:** YOLO, Computer Vision, Machine Learning, AI Algorithm Development

• **Robotics:** Robot Arm Programming & Control, Path Planning, System Integration

• **Industrial Automation:** PLC Programming, CNC Communication, Industrial Control Systems

• **CAD/CAM:** SolidWorks, 3D Modeling, Mechanical Design

• **Emerging Technologies:** Large Language Models (LLM), Model Context Protocol (MCP), Generative AI

## LANGUAGES

• **Chinese:** Native

• **English:** Proficient (TOEIC Score: 660)

• **German:** Elementary proficiency

## SUMMARY

Research-oriented engineer with demonstrated expertise in AI-driven robotics and intelligent manufacturing. Contributed 2 journal papers (1 SCI-indexed), 2 patents, and 3 conference papers. Led 6 major industry-academia projects involving large-scale automation systems (20 CNC machines, 10 robotic arms). Achieved measurable industrial impact: 80% manpower reduction, 27% production increase, and 91% defect reduction. Active in international academic exchange and national technology exhibitions.

*Last updated: February 2026*