



## TECHNICAL EXPERTISE

- System Integration & Embedded Systems
- Image Processing & Optical Systems
- Hardware & Software Co-Design
- Project Management & Product Development

## SKILLS

- Python
- MATLAB
- Linux
- Taguchi Methods
- SolidWorks
- AutoCAD
- Ansys
- SPSS

## WORK EXPERIENCE

- Firststep Bioresearch, Inc. | Project Manager | Project Management & System Integration 2023 Oct. ~ Present
  - Led end-to-end project execution, covering planning, scheduling, and technical development.
  - Collaborated across teams (R&D, manufacturing, QA, and business) to streamline workflows.
  - Designed and developed software & hardware architectures, covering embedded systems, image processing, and automation.
  - Monitored progress & mitigated risks to ensure timely project completion.
  - Sole lead for a corporate collaboration with CTTI, overseeing both R&D and execution.

## RESEARCH & TECHNICAL PROJECTS

- Development of Fully Automated Fecal Sample Analysis System 2024 - 2025
  - Developed an automated fecal screening system to improve detection accuracy and reduce errors.
  - Integrated Raspberry Pi, CMOS camera, LED lighting, and light chamber for image analysis.
  - Designed the interaction mechanism between Raspberry Pi and PLC to coordinate data processing and mechanical operation.
  - Implemented image processing and database management using Python, OpenCV, and SQL.
- Development of an Optical Zoom Uncooled Thermal Imaging System for Environmental Observation | Ph.D. Research
  - Developed a thermal imaging monitoring system by integrating thermal sensors, zoom lenses, industrial computers, and GPIO modules.
  - Applied image processing techniques (NUC, DPC, IE) to enhance image quality using Python and OpenCV.
  - Collaborated on mechanical and circuit design, ensuring hardware and software coordination.
- Automatic Urinalysis Analyzer for Urine Strips 2022
  - Developed an automated system for analyzing URS test strips, reducing environmental and subjective errors in color judgment.
  - Integrated Raspberry Pi, CMOS camera, conveyor, LCD, and an enclosed chamber with a fixed light source for controlled illumination.
  - Implemented image processing and database management using Python, OpenCV, and SQL.
- Laser Rangefinder Testing Platform 2021
  - Developed an optical path alignment system for laser rangefinder testing.
  - Designed using SolidWorks and CNC machining, with laser-engraved components.
  - Integrated Raspberry Pi, CMOS camera, manual slide table, LCD, and beam splitter for precise measurements.
- Temperature Testing Chamber for Cold Finger 2020
  - Designed a vacuum chamber with temperature sensors to analyze cooling rate and ultimate temperature.
  - Developed hardware using AutoCAD and manufactured via laser engraving.
  - Integrated Raspberry Pi, LCD, and temperature sensors for data logging.
- Development of Compact Immunoassay System for Helicobacter Pylori Detection | Master's Research
  - Designed a portable diagnostic device with Raspberry Pi, CMOS camera, LED illumination, and a controlled light chamber.
  - Optimized detection accuracy using the Taguchi method.
  - Developed in Python, using OpenCV and SQL.

## PUBLICATIONS & PATENTS

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- **Refereed Journal Paper**
  - Lin, K.-W., & Chang, Y.-C. (2021). Embedded immunodetection system for fecal occult blood. *Biosensors*, 11(4), 106.
  - Lin, K.-W., Wang, T.-Y., & Chang, Y.-C. (2021). Impact of top electrodes on the nonvolatile resistive switching properties of citrus thin films. *Polymers*, 13(5), 710.
  - Lin, K.-W., & Chang, Y.-C. (2021). Use of the taguchi method to optimize an immunodetection system for quantitative analysis of a rapid test. *Diagnostics*, 11(7), 1179.
- **Refereed Conference Paper**
  - Lin, K.-W. & Hou, T.-W. (2016, August). With a controllable mobile apparatus rapid test detection system (in Chinese). In *Proceedings of the 20st Nano Engineering and Microsystem Technology Conference*, Hsinchu, Taiwan.
  - Lin, K.-W., Weng, W.-C. & Lai, C.-F. (2019, June). Development of Immunoassay System for Helicobacter Pylori Detection (in Chinese). In *Proceedings of the International Conference on Smart Sensors 2019*, Hsinchu, Taiwan.
  - Lin, K.-W. & Chang, Y.-C. (2020, October). Immunodetection System for Fecal Occult Blood Rapid Test. In *Proceedings of the IEEE 6th International Conference on Applied System Innovation 2020*, Taitung, Taiwan.
  - Lin, K.-W. & Chang, Y.-C. (2021, September). Using the Taguchi Method to Optimize Immunodetection System for Quantitative Analysis of Rapid Test. In *Proceedings of the IEEE 7th International Conference on Applied System Innovation 2021*, Chiayi, Taiwan.
  - Lin, K.-W. & Chang, Y.-C. (2023, April). Development of An Optical Zoom Uncooled Thermal Imaging System for Environmental Observation. In *Proceedings of the IEEE 9th International Conference on Applied System Innovation 2023*, Chiba, Japan.
- **Patent**
  - I752684 INTEGRATED CARRIER FOR RAPID TEST KITS 2020 Oct.
  - M610229 DEVICE FOR READING RAPID TEST 2020 Oct.
  - M606957 DEVICE FOR READING RAPID TEST 2020 Oct.
  - I734413 STRIP DETECTING APPARATUS 2020 Mar.

## INTERNATIONAL CONFERENCES & EXHIBITIONS

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- International conference "MEMS 2025" – Staff Member 2025 Jan.
- Bio Asia Taiwan Exhibition – Exhibitor 2020 Jul.
- MEDICAL FAIR THAILAND – Exhibitor 2019 Sep.
- Engineering Colleges Partnership Forum in Asia (ECPFA) – Engineering Student Representatives 2019 Aug.
- Bio Asia Taiwan Exhibition – Exhibitor 2019 Jul.
- Bio Taiwan Exhibition – Exhibitor 2018 Jul.
- International conference "Transducers 2017" – Staff Member 2017 Jun.

## AWARDS & SCHOLARSHIPS

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- **Competitions**
  - 11th Instrument Technology Innovation Competition – Finalist 2019 Oct.
  - Ministry of Economic Affairs – Technology Development Program for Academia 2018 Dec.
  - National Cheng Kung University Technology Licensing and Incubation Center – Innovation & Entrepreneurship Startup Festival 2018 Nov.
  - NCKU Dreams Come True Program – "Dreams Come True • Prototype" 2018 Jun.
  - 9th Instrument Technology Innovation Competition – Honorable Mention 2017 Jun.
- **Scholarship**
  - Ministry of Economic Affairs, Industrial Development Bureau 5G+ Industry Rising Stars Sailing Program 2022
  - National Cheng Kung University Department of Engineering Science Graduate Institute Scholarships 2021 - 2022
  - Ministry of Science and Technology Encourages Enterprises to Participate in the Pilot Program for Cultivating Doctoral Students 2019 - 2022