# Yu-Zheng Lin

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## EDUCATION

*2022 - Present* **The University of Arizona**, Tucson, AZ

**Ph.D. Candidate** – Electrical and Computer Engineering (Anticipated graduation date: 12/26)

– Research Interest: High-Performance Computing, Digital Twin, Machine Learning, Large Language Model, Signal Processing, Cybersecurity

– Advisor: Dr. Pratik Satam

*2016* **National Taiwan University of Science and Technology (TaiwanTech)**, Taiwan

**M.Sc**. – Electronics and Computer Engineering

*2014* **Hsiuping University of Science and Technology**, Taiwan

**B.E.** – Electrical Engineering

## Professional Experience

*2022 Aug - Present* **Graduate Research Assistant** (NSF Funded)**,** The University of Arizona

*2016 Nov – 2019 Dec* **Research Assistant,** Instrumentation Development Division – Vacuum Group, National Synchrotron Radiation Research Center, Taiwan

*2014 Sep - 2016 Aug* **Graduate Research Assistant,** Photonics System and Simulation Design Laboratory, National Taiwan University of Science and Technology, Taiwan

*2013 July - 2013 Sep* **Internship, Department of Research and Development** SYRIS Technology Corp., Taiwan

*2012 Aug - 2014 Aug* **Undergraduate Research Assistant,** Wireless Sensing Laboratory, HUST, Taiwan

## Additional Training

*2025 June* **CI Pathway – ML& AI Track** (Competitively selected participant)

***The National Center for Supercomputing Applications, UIUC,*** *Certification Link*

- Focused on machine learning workflows on HPC systems
- Conducted experiments on NCSA's Delta supercomputer to optimize large-scale ML tasks
- Hands-on training with PyTorch, model parallelism, and multi-GPU training techniques

*2024 July* **CoDaS-HEP: Computational and Data Science for High Energy Physics,**

***Princeton University***, with Full Travel Funding

Focus on high-performance computing topics, including machine learning, parallel computing, and data processing.

*2024 April* **AI for Science on Supercomputer**

***Argonne National Laboratory,*** *Certification Link*

- Gained foundational understanding of the mathematical principles underpinning machine learning algorithms
- Gained hands-on experience submitting and executing parallel jobs on Polaris, a 44-petaflop supercomputer at the Argonne Leadership Computing Facility

## Research Funding

2025 **Open AI Researcher Access Program (PI) - $2K**

For large language model robustness studies and potential application exploration in knowledge discovery and data mining.

## AWARDS

### Highlight

*2018* **Isamu Abe Prize,** The Isamu Abe Prize recognizes innovative ideas, achievements, and applications in the field of accelerator control, and it is granted every two years by PCaPAC.

### Others

*2024* **Outstanding Teaching Assistant**, The University of Arizona

*2017* **The Silver Medal Award,** Taipei International Invention Show & Technomart

*2015* **3rd Place**, The 6th NTUST Entrepreneurship Competition (TaiwanTech) – Optics Brick

*2014* **1st Place**, The 9th Digital Signal Processing Creative Design Contest Award – Healthcare Applications (Ministry of Education (Taiwan))

*2013* **2nd Place & Texas Instruments Award,** The 8th Digital Signal Processing Creative Design Contest Award - Green Energy and Control (Ministry of Education (Taiwan))

*2012* **Bronze Medal Award,** TEMI International Microcontroller Technical and Creative Application

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| | Contest - Mini Self-Driving Car Racing (Taiwan Embedded Microcontroller Development Institute) |
| *2012* | **An Excellent Work,** The 2th NDHU Solar Energy & Photonics Creativity Contest Industry-University Cooperative (National Dong Hwa University - Energy Technology Center) |
| *2012* | **Remarkable Award**, The 7th Holtek MCU Creativity Contest - Control Application (Holtek Semiconductor) |

## EXPERTIES & INTERESTS

**Research Interests**

- Digital Twin, Machine Learning, Large Language Model, Signal Processing
- Cyber Security - Cyber-Physical System Security, ML-based intrusion detection
- Internet of Things
- Particle Accelerator Control System

**Techniques**

- Programming Skills: C/C++, Python, JavaScript (Front-End & Back-End)
- Machine Learning: Tensorflow, PyTorch, Sci-Kit Learn, Large Language Models (GPT, Llama), RAG (GraphRAG, LangChain)
- High Performance Computing: OpenMP
- Data Engineering & Visualization: Databases (InfluxDB, MongoDB, MySQL), Grafana
- Cloud Platform (GCP, AWS)
- Linux, Git

## TEACHING EXPERIENCE

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| 2024 Fall | **Teaching Assistant**, Web Development and the Internet of Things |
| 2021 Summer | **Professional Guest Lecturer from Industry,** MLOps Engineering: Building Reliable ML Systems |
| 2014 Fall | **Teaching Assistant**, Introduction to Photonics Engineering Laboratory |
| 2014 Spring | **Teaching Assistant**, Introduction to Digital Signal Processing |
| 2013 Fall | **Teaching Assistant**, Principles of Microprocessor Systems |

## Professional References

**Prof. Pratik Satam**
University of Arizona
• Relationship: Ph.D Advisor
• Email: pratiksatam@arizona.edu

**Dr. I Ching Sheng**
Lawrence Berkeley National Laboratory
• Relationship: Principal Investigator (NSRRC)
• Email: shengic@lbl.gov

## PUBLICATION

***SCI-Index Publication***

[1] **Lin, Y. Z.**, Shi, Q., Yang, Z., Latibari, B. S., Shao, S., Salehi, S., & Satam, P. (2024). DDD-GenDT: Dynamic Data-driven Generative Digital Twin Framework. *arXiv preprint arXiv:2501.00051*. **(Accepted by IEEE Transactions on AI)**

[2] Rahman, M. W. U., **Lin, Y.-Z.**, Weeks, C., Ruddell, D., Gabriellini, J., Hayes, B., Hariri, S., & Ziegler Jr., E. V. (2025). AI/ML-based detection and categorization of covert communication in IPv6 networks. *arXiv preprint arXiv:2501.10627* **(Accepted by Springer Cybersecurity)**

[3] Yousseef, A., **Lin, Y.-Z.,** Satam, S., Saber Latibari, B., Pacheco, J., Salehi, S., Hariri, S., & Satam, P. (2025). *Autonomous vehicle security: Hybrid threat modeling approach*. IEEE Open Journal of Vehicular Technology.

[4] Ghimire, S.*, **Lin, Y. -Z.***, Mamun, M., Chowdhury, M. A., Alemi, F., Cai, S., ... & Salehi, S. (2025). HWREx: AI-enabled Hardware Weakness and Risk Exploration and Storytelling Framework with LLM-assisted Mitigation Suggestion. *ACM Transactions on Design Automation of Electronic Systems*.
**Note: ∗Authors contributed equally to this research.**

[5] Chuang, J. Y., **Lin, Y. Z.**, Hsiao, Y. M., Liu, Y. C., Shu, D., Kuan, C. K., ... & Yen, J. Y. (2020). Discussion and improvement of a blade-type XBPM with coupling suppression by compensating calibration coefficients. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, *953*, 163174.

***Conference Paper (First Author with Oral Presentation)***

[1] **Lin, Y. Z.**, Petal, K., Alhamadah, A. H., Ghimire, S., Redondo, M. W., Corona, D. R. V., ... & Satam, P. (2025). Personalized Education with Generative AI and Digital Twins: VR, RAG, and Zero-Shot Sentiment Analysis for Industry 4.0 Workforce Development. In *2025 ASEE Annual Conference & Exposition*.

[2] **Lin, Y. Z.**, Shao, S., Rahman, M. H., Shafae, M., & Satam, P. (2023, October). DT4I4-Secure: Digital Twin Framework for Industry 4.0 Systems Security. In *2023 IEEE 14th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON)* (pp. 0200-0209). IEEE.

[3] **Lin, Y. Z.**, Chuang, J. Y., Sheng, I. C., Cheng, Y. T., Chang, C. C., Yang, Y. C., ... & Huang, C. H. (2018). Development of a task-oriented chatbot application for monitoring Taiwan photon source front-end system. *Proc. PCaPAC'18*, 228-229.

***Conference Paper (Co-Author)***

[1] Alhamadah, A., Mamun, M., Harms, H., Redondo, M., **Lin, Y. Z.**, Pacheco, J., ... & Satam, P. (2024). Photogrammetry for Digital Twinning Industry 4.0 (I4) Systems. In *2024 IEEE/ACS 21st International Conference on Computer Systems and Applications (AICCSA)* (pp. 1-6). IEEE

[2] Zhang, C., Shao, W., Wang, X., Cao, Y., Alhamadah, A. H. J., **Lin, Y. Z.**, ... & Watkins, L. (2024, September). Explainable Autonomic Cybersecurity System for Smart Power Grid. In *2024 IEEE Conference on Communications and Network Security (CNS)* (pp. 1-6). IEEE.

[3] Yang, Y. C., **Lin, Y. Z.**, Chuang, J. Y., Chan, C. K., & Chang, C. C. (2020, August). Status of the TPS Vacuum Control System. In *17th International Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPCS'19), New York, NY, USA, 05-11 October 2019* (pp. 1485-1487). JACOW Publishing, Geneva, Switzerland.

[4] Chuang, J. Y., Hsiao, Y. M., **Lin, Y. Z.**, Liu, Y. C., Cheng, Y. T., Shueh, C., ... & Yang, Y. C. (2019, November). Real-Time Synchronized Calibration and Computing System with EPICS Based Distributed Controls in the TPS XBPM System. In *8th International Beam Instrumentation Conference (IBIC'19), Malmö, Sweden, 08-12 September 2019* (pp. 548-551). JACOW Publishing, Geneva, Switzerland.

[5] Yang, Y. C., Chuang, J. Y., Hsiao, Y. M., **Lin, Y. Z.**, Chan, C. K., & Chang, C. C. (2019). Vacuum Control System for the Taiwan Photon Source. *Proc. PCaPAC'18*, 63-65.

[6] Yang, Y. C., Liang, C. C., Chen, C. S., Chung, J. Y., Chan, C. K., Chang, C. C., ... & **Lin, Y. Z.** (2018, June). Vibration Measurements in the TPS Vacuum System. In *9th Int. Particle Accelerator Conf.(IPAC'18), Vancouver, BC, Canada, April 29-May 4, 2018* (pp. 3772-3774). JACOW Publishing, Geneva, Switzerland.

[7] Huang, C. H., Chiu, P. C., Wu, C. Y., **Lin, Y. Z.**, Hsiao, Y. M., Chuang, J. Y., ... & Hsu, K. T. (2018, March). Beam stability diagnostics with X-ray beam position monitor in the Taiwan Photon Source. In *6th Int. Beam Instrumentation Conf. (IBIC'17), Grand Rapids, MI, USA, 20-24 August 2017* (pp. 217-220). JACOW, Geneva, Switzerland.

[8] Chuang, J. Y., **Lin, Y. Z.**, Cheng, C. M., Yang, Y. C., Chang, C. C., & Sheng, I. C. (2018). The Development of a Fpga Based Front End Safety Inter-Lock System.

[9] Chuang, J. Y., **Lin, Y. Z.**, Chen, W. C., & Lin, C. S. (2017, December). The construction of coherence microscope for extreme ultraviolet mask defect inspection in synchrotron facility. In *2017 IEEE/SICE International Symposium on System Integration (SII)* (pp. 440-443). IEEE.

[10] Chuang, J. Y., Kuan, C. K., Sheng, I. C., **Lin, Y. Z.**, Hsiao, Y. M., Yang, Y. C., ... & Lin, C. S. (2017, May). Development and Construction of Safety and Control Systems for the TPS Front End Interlock. In *8th Int. Particle Accelerator Conf.(IPAC'17), Copenhagen, Denmark, 14-19 May, 2017* (pp. 1947-1950). JACOW, Geneva, Switzerland.

**Invention patents**

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|---|---|
| 2018 | I614543 (TW), Optical system |
| 2017 | I594725 (TW), Portable Pupil Measuring Device and Measuring Method Thereof |
| 2014 | I457546 (TW), Apparatus for Measuring Solar Illumination and The Method Thereof |