

# Tianyi (Bruce) Chen

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## EDUCATION

### University of California at Santa Barbara

*Master of Science in Electrical and Computer Engineering*

Santa Barbara, CA, USA

09/2025 - Current

- *GPA: 3.80/4*

- *Relevant Courses: Tensor Computing, Advanced Control Lab Design, ML Design & Test Part A*

### Northern Arizona University

*Bachelor of Science in Computer Engineering*

Flagstaff, AZ, USA

09/2020 - 05/2024

- *GPA: 3.97/4*

- *Relevant Courses: Artificial Intelligence, Capstone Design, Electric Drives, Web Programming, etc*

## EXPERIENCE

### Undergraduate Research Assistant

*Digital Systems Design Laboratory, Northern Arizona University*

11/2023 - 05/2024

Flagstaff, USA

- Researched COVID-19 Chest X-ray image classification with SOTA vision models and analysis methods including GradCAM with R packages for online demonstration
- Proposed a modified Vision Transformer model achieving 95.79% accuracy
- Implemented Kyber cryptography for secure image transmission
- Published two papers (one journal, one flagship conference) based on the research findings

## PROJECTS

### PEFT on Swin Transformer by Tensor Decomposition | Pytorch, Tensorly

09/2025 - 12/2025

- Applied CP decomposition to the Swin Transformer model during fine-tuning
- Reduced trainable parameters from 27.52M to 45.5K (approximately 1.8%)

### Pendubot Upright Swing-up Control and Stabilization | MATLAB, Simulink

11/2025 - 12/2025

- Controlled the pendubot's shoulder joint to swing its two arms upright using PFL/TO
- Maintained its upright state using LQR

### XAMPP-based PHP Server for Web Services | PHP, MySQL, Nginx, Frp, ESP32

- Set up a PHP server to let users save and download private and public files with MySQL database support
- Enable users to access the information (including textual and image data) uploaded from IoTs (like ESP32) microcontrollers and manage them
- Implemented Nginx as a reverse proxy and Frp for secure remote access

### SwinJSCC-based Image Compression and Transmission on LEO Satellite

12/2024 - 06/2025

- Utilized the PPO algorithm to control joint-source-channel-coding with the SwinJSCC model
- Simulated transmission on the LEO2Ground channel, accounting for losses and fading

### FPGA-based Alarm System Design Competition | Intel Cyclone-V FPGA, ESP8266

10/2022 - 12/2022

- Programmed an Intel Cyclone-V FPGA and ESP8266 board to build a temperature/light-sensitive alarm system
- Featured on-board buttons and LEDs accessible and controllable via remote access

More at <https://github.com/TyBruceChen>

## TECHNICAL SKILLS

**Languages:** Python, Rust, Go, Verilog, MATLAB, Simulink, PHP, JavaScript, HTML/CSS, MySQL, C/C++, R

**Developer Tools:** VS Code, Git, Vivado, Docker

**Libraries:** pytorch, huggingface, pandas, numpy, matplotlib, flask, tensorflow, scikit-learn, opencv, etc

**Multilingual Proficiency:** English (Full Professional), Chinese (Native), Japanese (J.Test D Cert)