XIE CHENGZHI

Email: wzq1442602031@163.com

Education *(Double Degree)*

University of Electronic Science and Technology of China 09/2020 - 07/2025

- UESTC Degree: B.Eng. in Electronic Information Engineering

University of Glasgow 09/2020 - 07/2025

- UofG Degree: B.Eng. in Electronic and Electrical Engineering

National University of Singapore 08/2025 - 06/2027 (Expected)

- NUS Degree: MSc of Precision Health and Medicine

Research Experience

Team Design Project: Smart Tracking Car **Team Leader** 03/2022 - 07/2023

- Analyzed and selected components for the trolley path project, assigning based on team members' familiarity for analysis and purchase.
- Designed motor drive boards and PCB plates in AD, utilizing a 3-layer component design architecture.
- Completed overall assembly of the car, component welding, power supply testing, PID differential steering control testing, and so on.
- Participated in the development and testing of a Python real-time image analysis system based on the OpenMV platform.
- Led the team in testing and debugging at an outdoor venue, completing the final project acceptance and reporting by part.
- Wrote a 24,000-word product report and created demo videos in English.

6GHz Patch Antenna Design and Analysis Using CST **Team Leader** 03/2022 - 07/2023

- Analyzed design requirements for a 6GHz patch antenna, ensuring reflection coefficient is below 10dB, among other specifications.
- Established a parameter model in the CST simulation platform and completed electromagnetic simulations.
- Optimized the design scheme of the patch antenna by improving materials and physical parameters. - Generated an improved simulation 3D Far-field diagram meeting design requirements.

ECG Signal Acquisition Based on LTspice Device Design 09/2022 - 01/2023

- Analyzed human ECG signal frequency, external interference signal frequency, and noise frequency.
- Analyzed ECG status of patients, monitoring ECG signals of the elderly and vulnerable populations in real-time.
- Set up signal source, signal amplifier circuit, and filter circuit on the LTspice platform to output ECG signals post-acquisition.
- Analyzed signal accuracy and evaluated device impact on the human body.

Application of Artificial Intelligence Genetic Algorithm for Resistance Device Selection 09/2022 - 01/2023

- Analyzed thermistor working principles and the influence of different resistance values on the system's characteristic values.
- Designed the system in MATLAB, including objective equations and parametric expressions.
- Iterated and optimized the genetic algorithm in Python for system suitability.
- Judged selection and optimization results using convergence curves and optimization trajectories.

FPGA-Based Zero IF Receiving and Transmitting Image Suppression Algorithm Optimization **Team Leader** 09/2021 - 07/2022

- Collected literature and reviewed methods for zero and intermediate frequency image suppression.
- Cascaded the maximum likelihood estimation ascending dimension design with the FastICA algorithm for optimization.

- Tested on an FPGA board, performed waveform and vector analysis. Simulated the maximum likelihood estimation algorithm in Simulink and completed feasibility verification.
- Designed digital logic based on Verilog, cascading the FastICA algorithm to complete program design.
- Tested and accepted on Zedboard (FPGA) and ADFMCOMMS3 (SDR RF).

Cryptographic System Design Based on Embedded Devices 09/2021 - 01/2022

- Designed a 5-bit cipher system in STM32 module, triggering locks and alarms after three incorrect inputs.
- Connected embedded device to external display modules, providing positive/false prompts and buzzer alerts.
- Implemented serial input and output between the embedded system and PC.

Digital Logic Design for A Simple CPU Based on VHDL **Team Leader** 09/2021 - 01/2022

- Designed the basic CPU instruction set and timing, storing operation instructions in memory.
- Sequentially executed program operations like shifting, reversing, multiplying, dividing, and translocating based on clock triggers.
- Designed logic systems, wrote nested loops, adder multipliers, and other program units.
- Implemented CPU pipeline design with built-in instruction initialization.

Environmental Awareness Radar System Design 06/2024 – 06/2025

- Developing a hardware-sharing environment-aware radar system that integrates spectrum sensing, target detection, and communication transmission, enabling detection and signal transmission under dynamic spectrum allocation.
- Developing an intelligent scheduling algorithm to achieve seamless switching between radar and communication signals using both time and frequency division in order to incorporate cognitive radio technology to monitor real-time spectrum usage and dynamically allocate available bands.
- Designing a dual-function frequency-hopping signal to allow target detection without interfering with communications, with plans to use multicarrier modulation to assign different subcarriers to radar and communication modules, maximizing spectrum utilization.

NeXtMD: New Generation of Stacked Framework for Accurate Identification of AIPs 03/2025 – 07/2025

- Precise computational identification of anti-inflammatory peptides (AIPs) remains challenging due to their short sequences and limited features, despite ongoing efforts using machine learning and deep learning.
- To address this, NeXtMD introduces a dual-module stacked framework combining ML-based preliminary predictions with a ResNeXt-based deep learning refinement stage, leveraging diverse sequence-derived descriptors.
- NeXtMD achieves superior performance and generalization over existing methods, offering a robust and interpretable tool for AIP discovery and broader bioactive peptide prediction tasks.
- Have published on BMC biology: Xie, C., Wei, Y., Luo, X. *et al.* NeXtMD: a new generation of machine learning and deep learning stacked hybrid framework for accurate identification of anti-inflammatory peptides. *BMC Biol* **23**, 212 (2025). https://doi.org/10.1186/s12915-025-02314-8.

PlantAMP: A Protein LLM for Plant AMPs prediction 05/2025 – 10/2025

- Plant antimicrobial peptides (PAMPs) are promising agents in agriculture and medicine, but traditional prediction methods face challenges such as low accuracy, reliance on handcrafted features, and high computational costs.
- To address these issues, we developed PlantAMP, a ProteinBERT-based classifier fine-tuned with prompt tuning and evaluated via cross-validation, MC-Dropout, and ensemble learning, outperforming existing models across all key metrics.
- PlantAMP offers a reliable, efficient framework for PAMP identification and provides a scalable strategy for adapting large language models to other bioactive peptide prediction tasks.
- Have published on Plant Communications: Xie C, Hong F, Wei Y, Xie S, Luo X, Li X, Su W, Xie X, Hao Y, Lyu H, Ding H, Yang H, Dao F. PlantAMP: A fine-tuned protein large language model for plant antimicrobial peptide prediction. Plant Commun. 2025 Nov 27:101625. doi: 10.1016/j.xplc.2025.101625. Epub ahead of print. PMID: 41316708.

Integrative Analysis of lncRNA Based on Machine Learning for Predicting Colon Cancer 09/2025 – 11/2025

- Colon cancer prognosis varies widely even within the same TNM stage, motivating the need for a robust and generalizable lncRNA-based survival risk model constructed from large, heterogeneous multi-cohort transcriptomic datasets.
- This project integrates univariate Cox regression with machine-learning survival frameworks (Elastic Net, CoxBoost, RSF, SVM, PLSRcox) to identify reproducible lncRNA biomarkers and derive complementary signatures that capture both linear and non-linear prognostic signals across seven GEO cohorts.
- The final RSFSig + Enet model demonstrates strong cross-cohort generalization (mean C-index $\approx$ 0.70) and consistent risk stratification, offering a biologically interpretable and scalable approach for personalized prognosis and adjuvant therapy decision-making in colon cancer.

Anti-cancer Peptides Prediction and Generation Through ML DL Stacked Model 09/2025 – now

- This project builds on stacked machine-learning and deep-learning frameworks to improve anti-cancer peptide prediction beyond traditional sequence-based models, using handcrafted descriptors (AAC, CKSAAP, PCP16) as a biologically meaningful feature backbone.
- Specifically, I built a two-layer module with ML DL stacked architecture, which lifted the stacked model's performance to an AUC of about 0.9 and enabled a more expressive yet efficient scoring function for ACP classification.
- I further wrapped the predictor into a full design pipeline, using a genetic algorithm to generate candidates and DL as the fitness scorer; from random peptides, the pipeline identified short (10-14 AA), moderately cationic and hydrophobic, highly novel, and developable high-confidence ACPs, providing prioritized leads for downstream experimental validation.
- This work is innovative, and I am currently preparing the manuscript with plans to submit it for publication.

Awards

Football Match of Glasgow College *Captain* 05/2023

- Third Place Winner

UESTC Recognition Conference 12/2021

- Model Student of UESTC
- Outstanding student leader of Glasgow College at UESTC

Cup Football Match of UESTC 11/2020

- Champion

The Geying Cup debate competition 11/2020

- Best Debater Award

Extracurricular activities

Volunteer Teaching at Xingwen County, Yibin City, Sichuan Province, China 07/2021

- Taught the children English, science, calligraphy, sports and other courses.
- Awarded the title of *Social Practice Outstanding Individual.*
- Awarded the title of *Excellent Social Practice Team.*

Volunteer of UESTC's 53rd Track Meet

- Assisted in organizing the games.
- Awarded the title of *Outstanding Volunteer*.

11/2020

Interests

Saxophone **Level 8**

- Standard Grade Examination Committee of The Central Conservatory of Music (China)

Drawing **Level 6**

- Chinese Calligraphy and Painting Level Test (Ministry of Education of China)

Weiqi **Level 2**

- National Weiqi Stage Competition (Chinese Weiqi Association)

Soccer