

GAO MINGZE

MSc Biotechnology

National University of Singapore

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EDUCATION

National University of Singapore

MSc Biotechnology

Current

University of Electronic Science and Technology of China

BSc Biotechnology

RESEARCH INTERESTS

Transcriptomics

Gene regulation

Functional genomics

RESEARCH EXPERIENCE

Nanozyme-Based Biosensor for Histamine Detection

Project overview. Explored a colorimetric histamine assay using a DAO/Fe-GMP enzyme-nanozyme architecture: DAO generates H_2O_2 from histamine, and Fe-GMP catalyses TMB oxidation to produce a colour signal.

- **Experimental work.** Led hands-on experiments and troubleshooting, including experiments on the paper-based sensor component.
- **Synthesis and testing.** Prepared Fe-GMP nanoparticles, verified peroxidase-like activity, and optimized synthesis ratio and assay pH.
- **Cascade troubleshooting.** Tested DAO-histamine coupling across temperature, pH, reaction conditions and enzyme/substrate concentrations.

Results and improvements

H_2O_2 controls showed a linear response over 0–200 μM . The full histamine cascade was not achieved under the tested conditions. Further improvement should focus on DAO activity and compatibility of the coupled reaction conditions.

UNDERGRADUATE THESIS

Deep Learning for Predicting Bitter Compounds

Project overview. Built a multimodal classifier to predict whether a compound is bitter from its molecular structure, combining SMILES embeddings, molecular fingerprints and graph features.

- Implemented the Python workflow for preprocessing, feature extraction, model training/testing and performance evaluation.
- Compared feature combinations and prediction networks through ablation experiments to assess component contributions and guide model improvement.

0.934 Accuracy

0.978 AUC

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TECHNICAL SKILLS

Experimental

Molecular cloning
SnapGene primer design
Recombinant plasmids
Protein expression,
isolation and purification
Chromatography
Enzyme/activity assays
Troubleshooting

Computational

Python
Data processing
Statistical modelling
Machine/deep learning
Scientific visualization
Linux / shell
Docker
Basic server maintenance

Currently developing

R / Bioconductor
RNA-seq analysis
Transcriptomics and
functional genomics

PROFESSIONAL EXPERIENCE

Teaching Assistant / Automation Support

New Oriental Education (Chengdu) Co., Ltd.

Feb 2026 – Jul 2026

- Integrated a data API to automate score processing.
- Developed server-side tools for class-schedule and homework tracking.

Assistant Fermentation Engineer

Inner Mongolia Hulunbuir Northern
Pharmaceutical Co., Ltd.

Dec 2024 – Mar 2025

- Monitored yucolimycin fermentation parameters and checked samples for non-target microbial contamination.

ADDITIONAL SCIENTIFIC WORK

Gut Microbiome and Cardiovascular Disease

Literature review covering microbiome-derived metabolites, inflammation, atherosclerosis, hypertension, myocardial infarction, and proposed mechanistic links to cardiovascular pathology.

SELECTED AWARDS

2024 Third Prize · National Life Sciences Competition for College Students

2023 Second Prize · "Challenge Cup", Sichuan Province

2023 / 2024 UESTC Model Student Scholarship · awarded twice