

Chengwei Xi

Tel: +86 18313708512 Email: wessshrimpy@gmail.com | xi_@hust.edu.cn

Education

Huazhong University of Science and Technology (HUST)

Sep. 2023 - Present

B.S. Candidate in Bioscience, School of Life Science and Technology

Official GPA: 3.93/5.00 **Major GPA:** 3.79/4.00 (WES-style conversion) **Cumulative Average:** 84.4/100

Selected Coursework: Organic Chemistry; Biochemistry I & II; Cellular Biology; Immunology; General Biology Part I & II; Microbiology; Molecular Biology; Genetics; Anatomy and Physiology; Model Organism; Biophysics; Bioinformatics (Interdisciplinary Course); Biostatistics; Developmental Biology; Metabonomics; Genomics; Neurobiology; Epigenetics; Frontiers of Biochemistry and Molecular Biology; Environmental Ecology; Introduction to Artificial Intelligence; Biological Field Practice; Technology and Application Programming (Bioinformation).

Additional Quantitative / Computing Coursework: Fundamentals of Computer Programming (C++); Probability Theory and Mathematical Statistics; Computer Vision.

Audited Coursework (NUS): Evolution of Development

Research Experience

Monteiro Lab, Department of Biological Sciences, National University of Singapore (NUS)

Aug. 2026 - Dec. 2026

Research Intern (PI: Prof. Ant3nia Monteiro; Supervisor: Suriya Murugesan)

Project: Electroporation-Based Cross-Species Cis-Regulatory Analysis of GRN Co-option in Butterfly Eyespot Evolution

Techniques: Lepidopteran wing dissection; in vitro wing-tissue culture; electroporation; plasmid delivery; EGFP reporter assays; fluorescence and confocal microscopy; cis-regulatory element analysis.

- Culture and maintain fifth-instar larval wing tissues in vitro for developmental experiments.
- Optimize electroporation-based reporter delivery by comparing voltage, pulse number, plasmid concentration, delivery volume, and tissue viability.
- Introduce EGFP reporter constructs into developing *Bicyclus anynana* wing tissue by electroporation and assess reporter expression using fluorescence and confocal microscopy.
- Test EGFP reporter constructs driven by Distal-less (Dll)-associated cis-regulatory elements in developing wing tissue.
- Use *B. anynana* Dll cis-regulatory elements as positive controls for enhancer activity in future eyespot-center cells.
- Test orthologous Dll cis-regulatory elements from related Lepidoptera in the *B. anynana* wing environment to assess cross-species regulatory activity and evaluate GRN co-option and cis-regulatory pleiotropy in eyespot evolution.

Sleep and Circadian Biology Laboratory, HUST

Aug. 2025 - Present

Undergraduate Research Assistant & Graduation Thesis Student (PI: Prof. Luoying Zhang)

Project: Teneurin-a-Mediated Neural Mechanisms of Sleep Regulation

Techniques: *Drosophila* protein extraction; Western blotting; qPCR; *Drosophila* sleep monitoring; GAL4/UAS-mediated genetic manipulation; *Drosophila* husbandry and maintenance.

- Investigate how functional interactions between ten-m and ten-a contribute to sleep regulation and neural function in *Drosophila*.
- Use GAL4/UAS and split-GAL4-related strategies to perform RNAi-mediated knockdown of ten-a in specific brain regions.
- Conduct sleep and locomotor-behavior experiments using the *Drosophila* Activity Monitor (DAM) system and quantify behavioral phenotypes.
- Perform qPCR and Western blot experiments for molecular characterization.

Project: Graduation Research - Functional Analysis of GABABR3-Gq Signaling in Drosophila Sleep Regulation

Techniques: *Drosophila* genomic DNA extraction and genotyping; balancer chromosome-based genetic crosses and genotype construction; pharmacological manipulation and *Drosophila* sleep monitoring.

- Investigate the in vivo role of GABABR3, a comparatively poorly characterized insect GABAB receptor subtype, in sleep regulation.
- Build on protein-level evidence from a collaborating group suggesting an interaction between GABABR3 and Gq, and test the functional relevance of this pathway in *Drosophila*.
- Generate experimental genotypes through balancer chromosome-based genetic crosses and examine sleep phenotypes following genetic manipulation of GABABR3 and Gq.
- Use pharmacological feeding experiments to perturb GABAB signaling and compare sleep phenotypes across genotypes.
- Investigate how receptor-G-protein coupling may contribute to sleep and circadian regulation.

Project: Mouse Observational Pain Project

Techniques: transcardial perfusion; brain dissection; brain sectioning; slide mounting and staining; fluorescence imaging; electronic von Frey test; hot-plate test; mouse husbandry.

- Participated in experiments investigating observational/social transmission of pain in mice.
- Performed mechanical and thermal nociception assays, including electronic von Frey and hot-plate tests.
- Performed transcardial perfusion, brain dissection, tissue sectioning, slide mounting and staining, and fluorescence imaging.
- Participated in experiments involving TRAP2 animals, AAV-DIO-NpHR, and ACC-related viral/genetic neural-circuit manipulation strategies.

DNA and RNA Nucleases Laboratory, HUST

Dec. 2024 - Jun. 2026

Undergraduate Researcher / Undergraduate Research Project Leader (PI: Prof. Bin Zhu)

Project: Mechanistic Study and Applications of a Novel Multifunctional DNA Polymerase GP55

Techniques: recombinant protein expression and purification; SDS-PAGE; enzymatic activity assays; polymerase assays; strand-displacement assays; DNA/RNA substrate preparation; protein structure-function analysis.

- Substantially participated in the recombinant expression, purification, and biochemical characterization of the phage-derived multifunctional polymerase GP55.
- Characterized DNA polymerase, primase, strand-displacement/helicase-like, and exonuclease activities using biochemical assays.
- Explored codon optimization strategies for GP55 and evaluated their potential effects on recombinant protein production and downstream strand-displacement performance.

Research Experience (continued)

Molecular and Neural Circuitry Laboratory, HUST

Sep. 2024 - Aug. 2025

Undergraduate Researcher (PI: Prof. Zhengxing Wu)

*Project: Neuropeptidergic Regulation of Associative Learning and Odor-Food Coupling in *Caenorhabditis elegans**

Techniques: *C. elegans* hatching, culture, expansion, synchronization, and chemotaxis assays.

- Used multiple neuropeptide-deficient *C. elegans* strains to investigate neural and neuropeptidergic mechanisms underlying associative learning and olfactory behavior.

Kunming Institute of Zoology, Chinese Academy of Sciences

Jul. 2025 - Aug. 2025

Research Assistant

Techniques: non-human-primate husbandry and routine care; in vivo physiological data and biological sample collection, including electrocardiography (ECG), venous blood sampling, and fecal sampling; postmortem dissection and tissue collection; qPCR.

- Participated in non-human-primate research, animal handling, physiological data and sample collection, experimental pathology, and tissue sampling, while providing molecular-biology support.

Synthetic Biology and Biomaterials Laboratory, HUST

Jun. 2024 - Aug. 2024

Undergraduate Research Assistant (PI: Prof. Yunjun Yan)

Techniques: basic molecular cloning; restriction digestion; DNA ligation; bacterial transformation and culture; plasmid extraction; PCR; agarose gel electrophoresis; gel purification.

- Assisted with routine molecular-biology experiments.

Additional Experimental Projects / Training

Course-Based Cell Biology Project, HUST

Dec. 2025 - Jan. 2026

Project: Sodium Butyrate Effects on HeLa Cell Phenotypes

Techniques: HeLa cell culture and passaging; pharmacological treatment; scratch/wound-healing assay; CCK-8 assay; colony-formation assay; qPCR; autophagy-related assays.

- Investigated dose-dependent effects of sodium butyrate (NaBu) on HeLa cell phenotypes.

Biophysics Experimental Training, HUST

Apr. 2026 - Jun. 2026

Course-Based Experimental Project

Techniques: zebrafish in vivo electroretinography (ERG); ex vivo single-cell patch-clamp recording; voltage-clamp recording.

Field Biology Training, HUST

Jun. 2025 - Jul. 2025

Course-Based Field Training

Techniques: field collection of insects; insect specimen preparation and preservation.

Independent Coding Projects

Small, self-initiated AI projects developed with Codex, OpenClaw, and related tools to turn ideas into working prototypes.

Shrimpy Bilingual - <https://github.com/WesShrimpyXCW/Shrimpy-Bilingual>

LLM-based lightweight browser extension for academic-paper translation and bilingual reading, mainly designed to support academic English learning with context-aware translation and low translation cost.

Shrimpy Search - <https://search.shrimpy.work>

LLM-based public information collection and organization platform for PhD applications, providing simple analyses of prospective supervisors' funding, research activity, and other application-relevant information. Publicly available and still under active development.

Ufold - <https://ufold.seasideray.cn>

Peptide-folding strategy game based on concepts from biochemistry and structural biology, in which players aim to satisfy given functional constraints using as few amino-acid residues as possible.

BioMBTI - <https://wesshrimpyxcw.github.io/BioMBTI>

Social-media-style interactive quiz that recommends biology subfields based on users' interests and preferences; received more than 2,000 page views according to Umami Analytics.

Outdoor Experience

Well-Equipped Trekking Leader, Expedition Association, HUST

Led multi-day, well-equipped trekking trips without regular resupply, carrying camping equipment, food, water, cooking gear, lighting, and cold-weather equipment.

- Selected trips: Wugong Mountains - temperate mountain terrain, 3 days, 24 km; Tengger Desert - temperate desert, 3 days, 50+ km; Yubeng - high-altitude mountain terrain, winter, 5 days, 50+ km.

Skills & Languages

- **Molecular Biology:** Molecular cloning; PCR/qPCR; restriction digestion and DNA ligation; bacterial transformation/culture; plasmid preparation; agarose gel electrophoresis and gel purification; *Drosophila* genomic DNA extraction/genotyping.
- **Protein Biochemistry:** Recombinant protein expression/purification; SDS-PAGE; Western blotting; enzymatic, DNA polymerase, and strand-displacement assays; DNA/RNA substrate preparation.
- ***Drosophila* Genetics & Behavior:** Husbandry; GAL4/UAS and split-GAL4 strategies; RNAi; balancer chromosome-based crosses; DAM sleep/locomotor assays; pharmacological feeding.
- ***C. elegans* Genetics & Behavior:** Culture, expansion, and synchronization; mutant-strain maintenance; chemotaxis; odor-food associative-learning assays.
- **Insect Development & Imaging:** Lepidopteran wing dissection and ex vivo culture; electroporation; reporter-plasmid delivery; EGFP assays; fluorescence and confocal microscopy; enhancer/cis-regulatory element analysis.
- **Mammalian Cell Biology:** HeLa cell culture/passaging; pharmacological treatment; scratch/wound-healing, CCK-8, colony-formation, and autophagy-related assays.
- **Electrophysiology & Biophysics:** Zebrafish in vivo ERG; ex vivo single-cell patch-clamp and voltage-clamp recording.
- **Animal & Neural Circuit Techniques:** Mouse husbandry, transcardial perfusion, brain dissection/sectioning and staining, fluorescence imaging, electronic von Frey and hot-plate tests; non-human-primate husbandry, ECG, venous blood/fecal sampling, and postmortem tissue collection.
- **Field Biology:** Field insect collection; insect specimen preparation and preservation.
- **AI-Assisted Development:** Codex; OpenClaw; LLM-assisted prototyping; C++ programming coursework.
- **Languages:** English (IELTS 7.0); Chinese (Native).