

EDUCATION

B.S. Biological Science (Poling Class)

2018 – 2023

Nankai University, Advisor: Prof. Xinglu Huang

Poling Honors Degree

EXPERIENCE

Research Assistant

2022 – 2023

National Engineering Lab for Neuromodulation, Tsinghua University

Advisor: Prof. Yanan Sui

Visiting Student

2021 – 2022

Institute for Human Genetics, University of California, San Francisco

Advisor: Prof. Yin Shen

Intern

2021

National Engineering Lab for Neuromodulation, Tsinghua University

RESEARCH INTERESTS

Genomics (Functional, Computational), Epigenomics, Bioinformatics, Development and Application of Sequencing Techniques

PUBLICATIONS

- [1] Sun W, Wang N, **Liu H**, Yu B, Jin L, Ren X, Shen Y, Wang L. Genetically Encoded Chemical Cross-linking of RNA in vivo. *Nat Chem* 2023;15(1):21–32. PMID: 36202986
 - Designed the end-to-end analysis pipeline for GECX-RNA with immunoprecipitation sequencing (GRIP-seq), covering the entire process from raw sequencing data to RNA m6A sites with single-nucleotide resolution. <https://github.com/Shall-We-Dance/GRIP-seq>
 - Uploaded the sequencing data to NCBI SRA under the accession number PRJNA797913.
 - Computed minimum free energy (MFE) of RNA secondary structure for evaluation purposes.
 - My main contributions included Fig.6, Extended Data Fig. 3, Fig.S7, Table S2, Table S3 and the writing of the methods section detailing the data analysis for GRIP-seq.
- [2] Yang X, Wen J, Yang H, Jones IR, Zhu X, Liu W, Li B, Clelland CD, Luo W, Wong MY, Ren X, Cui X, Song M, **Liu H**, Chen C, Eng N, Ravichandran M, Sun Y, Lee D, Van Buren E, Jiang MZ, Chan CSY, Ye CJ, Perera RM, Gan L, Li Y, Shen Y. Functional characterization of Alzheimer's disease genetic variants in microglia. *Nat Genet* 2023;1–10. PMID: 37735198
 - Performed computational analysis. My main contributions included RNA-seq data process, Extended Data Fig. 2 and the writing of the methods section.
- [3] Yang, J, Chung, C, Koach, J, **Liu H**, Navalkar A, Zhao Q, Yang X, He L, Mittag T, Shen Y, Weiss WA, Shu X. Phase separation of Myc differentially modulates the transcriptome. *bioRxiv* 2022.06.28.498043; [Preprint]
 - Processed and analyzed all RNA-seq data in this study.
 - My main contributions included Fig. 7, Fig. S12, Fig. S13 and the writing of the methods section.
- [4] Wei Y, Wu J, Wu Y, **Liu H**, Meng F, Liu Q, Midgley AC, Zhang X, Qi T, Kang H, Chen R, Kong D, Zhuang J, Yan X, Huang X. Prediction and Design of Nanozymes using Explainable Machine Learning. *Advanced Materials* 2022;34(27):2201736. PMID: 35487518
 - Collected and organized data by grouping various factors.
 - Conducted initial statistical analysis to substantiate the hypothesis.
 - Contributed to the design of this neural network.

- [5] Sun Z, Liu Q, Wang X, Wu J, Hu X, Liu M, Zhang X, Wei Y, Liu Z, **Liu H**, Chen R, Wang F, Midgley AC, Li A, Yan X, Wang Y, Zhuang J, Huang X. Bioorthogonal catalytic nanzyme-mediated lysosomal membrane leakage for targeted drug delivery. *Theranostics* 2022;12(3):1132–47. PMID: 35154478
- Conducted molecular cloning for ferritin synthesis.
 - Illustrated the schemes, including Scheme 1, Fig. 1c, Fig. 4c, Fig. 6a.

SELECTED RESEARCH EXPERIENCE

End-to-End Design of GRIP-seq: A Novel Sequencing Technique for Detecting RNA m6A Sites with Single-nucleotide Resolution Using Unnatural Amino Acids

Advisor: Prof. Yin Shen & Prof. Lei Wang

Institute for Human Genetics, UCSF

Dec. 2021 – Jul. 2022

available on GitHub

The Analysis of Multiple Sequencing Libraries: scRNA-seq, ATAC-seq, RNA-seq, ChIP-seq, CLIP-seq, Hi-C, CRISPR, etc.

Advisor: Prof. Yin Shen

Institute for Human Genetics, UCSF

Oct. 2021 – Jul. 2022

Evaluation of AlphaFold2 Algorithms and Improvements for Enhanced Predictions

Advisor: Prof. Yanan Sui

National Engineering Lab for Neuromodulation, Tsinghua University

Website Available: <https://alphafold.lnsgroup.cc:5001>

Jul. 2021 – Sept. 2021

available on GitHub

Analyzing Nanodrug Delivery Efficiency in Tumors Using Machine Learning

Advisor: Prof. Xinglu Huang

State Key Laboratory of Medicinal Chemical Biology, Nankai University

Sept. 2020 – Jun. 2021

Designed Protein Nanocage H2E-FTn for Enhanced Lysosomal Escape In Vitro: Adding Short Repeats of HHE Oligopeptide at the N-terminal of Human H Ferritin

Advisor: Prof. Xinglu Huang

State Key Laboratory of Medicinal Chemical Biology, Nankai University

Sept. 2020 – Dec. 2020

AWARDS

Poling Honors Degree, Nankai University

Distinguished Undergraduate Thesis, Nankai University

Scholarship of Academic Progress, Nankai University

Third Prize in Innovative Scientific Research for Undergraduates of Nankai University

SKILLS

Programming	R, Python, Shell, HTML, CSS, Markdown, L ^A T _E X
Packages	Flask, Seurat, ggplot2, dplyr, edgeR, AlphaFold2, STAR, fastp, etc.
Software	Ai, VSCode, RStudio, Nginx, IGV, PyMOL, ImageJ, Zotero, Benchling, Conda, Docker, SnapGene, etc.
Wet Lab	Molecular Clone, Cell Culture, ATAC-seq, Smart-seq2, CUT&RUN, mRNA Display, CRISPR Screen, Mutagenesis, etc.

Please visit my homepage for more information: <https://cv.greymsea.cc>