

Peiyao (Pearl) Liu

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Education

Cincinnati Children's Hospital Medical Center & University of Cincinnati <i>M.S. Student in College of Medicine Biomedical Research Technologies(BMRT)</i>	Aug. 2023 - present <i>Cincinnati, United States</i>
Huazhong Agricultural University <i>B.S. Plant Science and Technology (major)</i>	Sep. 2017 - Jun. 2021 <i>Wuhan, China</i>
Chiba University <i>Visiting Student in Horticulture Summer Program</i>	Jun. 2019 <i>Chiba, Japan</i>

Relevant Coursework

Undergraduate courses: Molecular Biology, Genetics, Biochemistry, Cell Biology Microbiology, Biostatistics, Evolutionary Biology, Plant Physiology, Plant Developmental Biology, Ecology, Molecular Plant Breeding etc.

Postgraduate courses: Introduction to Biostatistics, Introduction to Functional Genomics, Advanced Methods in Biomedical Research (Histology and Microscopy, Stem Cell Technology, Gene Editing Technology, Animal Care and Use, Flow Cytometry, 3D Biofabrication), Journal Club, Ethics in Research

Research Experiences

Rotating student/Graduate Assistant in Dr. Zhiyuan(ZY) Chen's Lab <i>Reproductive Sciences Center, CCHMC</i>	Mar. 2024 - May. 2024 <i>Cincinnati, United States</i>
<ul style="list-style-type: none">Performing integrative analyses of published and unpublished datasets in mouse early development including oogenesis and preimplantation embryos.Learning to perform low-input epigenome profiling such as single embryo RNA-seq, CUT&RUN, and ATAC-seq, etc.Learning to perform mouse IVF, embryo culture, whole mount immunostaining, and confocal imaging	
Rotating student in Shared Core Facilities <i>Cincinnati Children's Hospital Medical Center (CCHMC)</i>	Aug. 2023 - May. 2024 <i>Cincinnati, United States</i>
<ul style="list-style-type: none">Designed gRNAs with donor oligos for CRISPR/Cas-derived genome editing system.Operated frozen microtome and paraffin microtome for tissue sectioning.Executed daily maintenance procedures for human pluripotent cells following diverse protocols.Utilizing flow cytometry to immunophenotypically characterize human peripheral blood mononuclear cells (PBMCs) from healthy individuals.Generating a Doxycycline-inducible human iPSC line with mScarlet red fluorescent reporter through CRISPR/Cas9 and recombination-mediated cassette exchange system.	
Rotating student in Dr. Bruce J. Aronow's Lab <i>Division of Biomedical Informatics (BMI), CCHMC</i>	Jan. 2024 - Mar. 2024 <i>Cincinnati, United States</i>
<ul style="list-style-type: none">Used the data pipeline process to combine and re-analyze a set of published organoid single cell genomics datasets.Explored the ToppCell website tool to generate understanding of the cell populations and the biologic interpretations of their gene expression.Learned how to submit batch jobs using CCHMC high-performance computing cluster.	

Rotating student in Dr. Takanori Takebe's Lab

Oct. 2023 - Dec. 2023

*Gastroenterology, Hepatology and Nutrition division, CCHMC**Cincinnati, United States*

- Directly differentiated and characterized liver mesenchymal cells and fibroblasts from human induced pluripotent stem cells (iPSCs).
- Conducted immunofluorescence assays and quantitative PCR (qPCR) to test the specificity and effectiveness of antibodies for characterizing liver fibroblasts and mesenchymal cells.

Research Assistant in Dr. Pengcheng Bu's Lab

Sep. 2021 - May. 2023

*Institute of Biophysics, Chinese Academy of Sciences(CAS)**Beijing, China*

- Conducted genotyping of mice
- Collected and processed mouse small intestine samples for immunochemical analysis.
- Performed daily maintenance on 293T and HCT116 cells.
- Built laboratory website based on Git and Node.js.
- Conducted a pan-cancer downstream analysis of colon adenocarcinoma/rectum adenocarcinoma esophageal cancer (COAD/READ) based on the TCGA database.
- Orally administered substances to mice and monitored their daily weight changes.

Undergraduate Research Assistant in Dr. Xuebo Hu's Lab

May. 2018 - Jul. 2021

*Huazhong Agricultural University**Wuhan, China*

- Used error-prone PCR and DNA Shuffling to achieve the directional evolution of hemagglutinin (HA).
- Completed literature review on the analysis of the nutritional components of baobab tree fruit.
- Independently wrote research proposals and applied for student grants.
- Analyzed the genes differentially expressed in *Ganoderma lucidum* under light and dark conditions with bioinformatical tools.
- **Thesis:** Transcriptome analysis of the effect of light on gene expression in *Ganoderma lucidum*.

Scientific Illustrator in Dr. Lingqiang Wang's Lab

May. 2018 - Jul. 2018

*Huazhong Agricultural University**Wuhan, China*

- Provided illustrations for publication.

Publication

Ali Muhammad, Huanhuan Hao, Yali Xue, Aftab Alam, Shuming Bai, Weicheng Hu, Muhammad Sajid, Zhen Hu, Rana Abdul Samad, Zihui Li, **Peiyao Liu**, Zhiqiang Gong & Lingqiang Wang*. *Survey of Wheat Straw Stem Characteristics for Enhanced Resistance to Lodging. Cellulose*, 2020, 27: 2469–2484

Specialized Skills

Biochemistry, Molecular Biology, Cell Biology, Genetics: Agarose Gel Electrophoresis, Western Blot, PCR, Error-Prone PCR, Quantitative Real-time PCR, Basic Molecular Cloning, Mammalian Cell Culture, Mammalian Cell Transfection, Immunohistochemical Staining, Frozen Section& Paraffin Section, Intestinal Organoid Culture, Immunocytofluorescence Staining, Wheat Cross Breeding, Hybridization of *Drosophila*

Bioinformatics: Bulk RNA-seq (upstream & downstream data analysis), scRNA-seq, ChIP-seq, CUT&RUN, CUT&Tag

Computer Skills & Programming Languages: Linux Operating System, Visual Studio Code, Elastic Compute Service; Shell, Groovy, R, Git, Vim, *node.js*, Python (beginner), Perl (beginner)

Animal experiments: Mouse Anatomy, Oral Administration, Intraperitoneal Injection

Others: LaTeX, Good Cooperation Skills and Independent Working Ability

Awards & Honors

Outstanding Graduate

Huazhong Agricultural University, 5-10% 2021

China National Scholarship

Ministry of Education of the People's Republic of China, 0.2% 2020

First Prize in DaBeiNong Group Enterprise Scholarship

Beijing DBN Technology Group Co Ltd, 0.2% 2019

First Prize in Excellent Academic Achievement

Huazhong Agricultural University, 0.3% 2019

Third Prize in Genetics Experimental Skills Competition

Huazhong Agricultural University 2019

Merit Student

Huazhong Agricultural University several times

Certifications

Python for Genomic Data Science

Coursera & Johns Hopkins University Mar. 2024

R Programming

Coursera & Johns Hopkins University Aug. 2024

Introduction to Reproduction

Coursera & Northwestern University Aug. 2024

Introduction to Genomic Technologies

Coursera & Johns Hopkins University Aug. 2024

Working with the IACUC

CITI Program Feb. 2024

Working with Mice in Research Settings

CITI Program Feb. 2024

Working with Rats in Research Settings

CITI Program Feb. 2024

Working with Non-Human Primates in Research Settings

CITI Program Feb. 2024

Working with Amphibians in Research Settings

CITI Program Feb. 2024

Conference

Developmental Biology Annual Symposium

CCHMC | Attended May. 2024
Cincinnati, United States

Pluripotent Stem Cells in Genetic Analysis & Disease Modeling: Diversity in a Dish

The Jackson Laboratory | Attended Oct. 2024
Virtual

Service & Leadership

Student Union Staff | Huazhong Agricultural University Jun. 2019 - Oct. 2019
Student Director of Innovation & Entrepreneurship Center of College Wuhan, China

- Assisted faculty in organizing the National Undergraduate Plant Protection Skills Competition

Captain | Chiba University Jul. 2019
Captain of Undergraduate Study Abroad Team of Huazhong Agricultural University Tokyo, Japan

- Managed files and help team members apply for visas
- Recorded itinerary and defended

Student Union Staff | Huazhong Agricultural University Sep. 2018 - Jun. 2019
Vice president of Science & Innovation Student Department of College Wuhan, China

- Recruited and trained new members
- Organized and hosted the defenses of undergraduate research projects& Invited judges
- Updated and maintained student records of the SHUOYAN postgraduate program
- Organize events (lectures, informational sessions)

Student Union Staff | Huazhong Agricultural University Sep. 2017 - Jul. 2018
Group leader of Science & Innovation Student Department of College Wuhan, China

- Invited researchers to give lectures to undergraduate students
- Helped undergraduates contact with faculty and choose thesis laboratories
- Helped undergraduates apply for student research grants

Languages

Chinese (Mandarin)

Native

English

Professional Working Proficiency

Japanese

Limited Proficiency or Conversational