

# Peiyao (Pearl) Liu

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## Education

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

## Relevant Coursework

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**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

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<b>Rotating student/Graduate Assistant in Dr. Zhiyuan(ZY) Chen's Lab</b> <i>Reproductive Sciences Center, CCHMC</i>	Mar. 2024 - May. 2024 Cincinnati, United States
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- Performing integrative analyses of published and unpublished datasets in mouse early development including oogenesis and preimplantation embryos.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

<b>Rotating student in Shared Core Facilities</b> <i>Cincinnati Children's Hospital Medical Center (CCHMC)</i>	Aug. 2023 - May. 2024 Cincinnati, United States
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- 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.

<b>Rotating student in Dr. Bruce J. Aronow's Lab</b> <i>Division of Biomedical Informatics (BMI), CCHMC</i>	Jan. 2024 - Mar. 2024 Cincinnati, United States
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- 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.
- Dependently 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.

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*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

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*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*

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### **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, 0.8%* 2019

### **Third Prize in Genetics Experimental Skills Competition**

*Huazhong Agricultural University* 2019

### **Merit Student**

*Huazhong Agricultural University* several times

## *Certifications*

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### **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*

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### **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*

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**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*

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**Chinese (Mandarin)**

*Native*

**English**

*Professional Working Proficiency*

**Japanese**

*Limited Proficiency or Conversational*