

Shiyong Liu

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EDUCATION

Case Western Reserve University , Cleveland, OH <i>Doctor of Philosophy, Epidemiology & Biostatistics</i>	08/2019 – present
Carnegie Mellon University , Pittsburgh, PA <i>Master of Science, Biomedical Engineering</i>	08/2016 – 12/2017
Fudan University , Shanghai, China <i>Bachelor of Science, Biological Sciences</i>	09/2012 – 07/2016
The University of Hong Kong , Hong Kong, China <i>Exchange Study, Biological Sciences</i>	09/2014 – 12/2014

RESEARCH EXPERIENCE

Case Western Reserve University , Cleveland, OH <i>Research Assistant for Dr. Dana Crawford</i> Longitudinal Changes in T-Cell Receptor Sequence Diversity in Minimal Change Disease <ul style="list-style-type: none">Characterized and compared the T-cell receptor repertoire metrics, including clonality and overlap, for patients with minimal change disease both during active disease and complete remissionIdentified T-cell receptor beta-chain amino acid sequences unique to the active disease statusCharacterize the major histocompatibility complex (MHC) region and estimate human leukocyte antigen (HLA) alleles from whole-genome sequencing data	12/2019 – present
<i>Rotation with Dr. Jonathan Haines</i>	03/2020 – 05/2020
Practice with Genome-Wide Association Study (GWAS) and Command Line Programs <ul style="list-style-type: none">Performed quality control, population stratification, and association analysis using PLINK and compared the characteristics of different versions of PLINK, including 1.07, 1.9 and 2.00 betaPracticed working with command lines, high-performance computing, and the LINUX system	
<i>Rotation with Dr. Hao Harry Feng</i> Analysis of Single-cell RNA Sequencing Data of Fragile X Syndrome (FXS) Forebrain Organoids <ul style="list-style-type: none">Analyzed the gene expression of the FXS forebrain organoids at the single-cell level, in which the differentially expressed genes and the conservative marker genes were obtained for each cluster, and the single-cell pseudo-time trajectories were constructed to show the altered developmental trajectory in a cell type-specific manner	09/2019 – 12/2019
University of Pittsburgh , Pittsburgh, PA <i>Research Assistant for Dr. (Joyce) Chung-Chou H. Chang</i> Statistical Approaches in Analyzing Medical Data <ul style="list-style-type: none">Identified the association between care fragmentation and mortality, adjusting for covariates and clustering effectsExplored surrogate marker in depth through literature research of causal inference and propensity score analysisInspected the data analytic strategies involved in the analysis of electronic health records using machine learning algorithms	04/2018 – 04/2019
Center for Neuroscience research, Allegheny General Hospital , Pittsburgh, PA <i>Research Assistant for Dr. Kevin M. Kelly</i> Changes of Hippocampal Neuropeptide Y (NPY) Protein Expression after Controlled Cortical Impact (CCI) <ul style="list-style-type: none">Identified the associations among long-term alterations of NPY expression in three targeting subfields of hippocampi, CCI treatment, and posttraumatic epileptogenesis adjusting for injury severity	08/2017 – 07/2018

Fudan University, Shanghai, China

Undergraduate Thesis Project (Mentor: Dr. Juan Lin)

11/2015 – 07/2016

Role of Ca²⁺/Cation Antiporters (CAX) Gene Family in *Arabidopsis Thaliana*

- Constructed overexpression vectors for *CAX1-11* to elucidate their function of salt/drought resistance and analyzed the gene expression after treated with a range of concentrations of cations with qPCR.

Research Intern for Dr. Feng Zhang

01/2015 – 10/2015

Identification of Single-Nucleotide Polymorphisms (SNPs) in *TBX6* Associated with Infertility in Mice

- Identified SNPs from the experimental CRISPR mice cohort with spermatogenic impairment and verified the findings in the human study groups.

PUBLICATIONS

Sun, Z., Liu, S., Kharlamov, E. A., Miller, E. R., & Kelly, K. M. (2018). Hippocampal neuropeptide Y protein expression following controlled cortical impact and posttraumatic epilepsy. *Epilepsy & Behavior*.

Zheng, Y., Wang, L. B., Sun, S. F., Liu, S. Y., Liu, M. J., & Lin, J. (2021). Phylogenetic and ion-response analyses reveal a relationship between gene expansion and functional divergence in the Ca²⁺/cation antiporter family in Angiosperms. *Plant Molecular Biology*, 1-18.

Kang, Y., Zhou, Y., Li, Y., Han, Y., Xu, J., Niu, W., Liu, S. Y., ... & Wen, Z. (2021). A human forebrain organoid model of fragile X syndrome exhibits altered neurogenesis and highlights new treatment strategies. *Nature Neuroscience*, 24(10), 1377-1391.

PRESENTATIONS

Liu, S., Longitudinal changes in T-cell receptor sequence diversity in minimal change disease. *American Society of Human Genetics (ASHG) 2020*.

AWARDS & HONORS

Summer Institute in Statistical Genetics (SISG) scholarship at the University of Washington (2020)

Diana Jacobs Kalman/AFAR Scholarships for Research in the Biology of Aging (2021)

TEACHING

Department of Population and Quantitative Health Sciences (PQHS), Case Western Reserve University

PQHS 431: Introduction to Statistical Methods I

Teaching Assistant

2021

SOFTWARE SKILLS

- R, SQL, Stata, Python, MATLAB, SAS, Java, etc.
- PLINK, MERLIN