Shiying Liu

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EDUCATION

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

RESEARCH EXPERIENCE

Case Western Reserve University, Cleveland, OH
Research Assistant for Dr. Dana Crawford 12/2019 – present
Longitudinal Changes in T-Cell Receptor Sequence Diversity in Minimal Change Disease

- 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 remission
- Identified T-cell receptor beta-chain amino acid sequences unique to the active disease status
- Characterize the major histocompatibility complex (MHC) region and estimate human leukocyte antigen (HLA) alleles from whole-genome sequencing data

Research Assistant for Dr. Jonathan Haines 03/2020 – 05/2020
Practice with Genome-Wide Association Study (GWAS) and Command Lind Programs

- 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 beta
- Practiced working with command lines, high-performance computing, and the LINUX system

Research Assistant for Dr. Hao Harry Feng 09/2019 – 12/2019
Analysis of Single-cell RNA Sequencing Data of Fragile X Syndrome (FXS) Forebrain Organoids

- 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

University of Pittsburgh, Pittsburgh, PA
Research Assistant for Dr. (Joyce) Chung-Chou H. Chang 04/2018 – 04/2019
Statistical Approaches in Analyzing Medical Data

- Identified the association between care fragmentation and mortality, adjusting for covariates and clustering effects
- Explored surrogate marker in depth through literature research of causal inference and propensity score analysis
- Inspected the data analytic strategies involved in the analysis of electric health records using machine learning algorithms

Center for Neuroscience research, Allegheny General Hospital, Pittsburgh, PA
Research Assistant for Dr. Kevin M. Kelly 08/2017 – 07/2018
Changes of Hippocampal Neuropeptide Y (NPY) Protein Expression after Controlled Cortical Impact (CCI)

- 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

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. (2020). Phylogenetic and ion-response analyses reveal a relationship between gene expansion and functional divergence in the Ca 2+/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 & HORNORS

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