PENG SU

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EDUCATION

Columbia University Mailman School of Public Health — **New York**
M.S. Biostatistics, Theory and Methods Track — *Aug. 2023 – Present*

- **GPA:** 3.97/4.00
- **Related Courses:** Probability, Statistical inference, Biostatistical methods, Data Science, Topics in Advanced Statistical Computing, survival analysis, Analysis of Longitudinal Data, etc.

Xi'an Jiaotong-Liverpool University (XJTLU) — **Suzhou, China**
The leading international joint venture university in China — *Sep. 2019 – Jul. 2023*
BSc in Bioinformatics

- **GPA:** 3.68/4.00
- **Related Courses:** Bioinformatics, Advanced Genetics, Artificial Intelligence, Database Development and Design, etc.

Training Experience: Complete a summer course (56 study hours) of Big Data & Bioinformatics Training on R Programming, Statistical Analysis, Data Visualization, and Survival Analysis (held by Inner Mongolia Medical University and Inner Mongolia Agricultural University, July 2021)

PUBLICATION

Submitted:

Su, P., Tchourine, K., Vitkup, D. (2024). Ecological Scaling of Temporal Fluctuations with Bacterial Abundance in Gut Microbiota Depends on Functional Properties of Individual Microbial Species and Bacterial Communities. bioRxiv, 625948. https://www.biorxiv.org/content/10.1101/2024.11.28.625948v1

Published:

Li, J., **Su, P.**, Li, T., Hao, Y., Wang, T., Fu, L., & Liu, X. (2024). The Role and Clinical Relevance of Glycolysis-Associated Genes on Immune Infiltration in Hepatocellular Carcinoma. Journal of cellular biochemistry, 125(8), e30620. https://doi.org/10.1002/jcb.30620

RESEARCH PROJECTS

Application of Taylor's Law in Temporal Variability of Gut Microbial Communities
Research Group Member, Supervisor: Professor Dennis Vitkup — *Feb. 2024-Present*

- Conducted research about the temporal variations in the abundance of gut bacteria by applying two types of Taylor's law, which relate the variance and mean of Amplicon Sequence Variants' (ASVs) abundance using a power law relationship on both community and individual aspects of gut bacteria, based on the abundance profile and taxonomy data of 126 ASVs across 56 Baboon hosts and 503 ASVs of 36 Human samples by R programming.
- Investigated the impact of ASV properties and function on the individual Taylor's law, including abundance, taxonomy and metabolic capabilities of ASVs.
- For Community Taylor's law:
  - Using correlation analysis and the Kolmogorov-Smirnov statistical test, study revealed a significant impact of different diets on the community Taylor's slope in the human microbiome, while gender showed no significant influence on Taylor's law in baboon hosts.
  - Additionally, identified the role of Carbohydrate-active enzymes (CAZymes), which associated with plant cell wall degradation in influencing the Taylor's slope.
- For ASV individual Taylor's law:
  - Identified a significant negative correlation between ASV relative abundance and Taylor's slope, with higher abundance leading to smaller temporal fluctuations; detected significant differences in Taylor's slope across different phyla, particularly between Bacteroidetes and other phyla.
  - Demonstrated that the size of ASV functional reaction networks is negatively correlated with Taylor's slope, suggesting that specific properties of individual species may determine the differences between Taylor's law.

Tumor Immune Microenvironment and Clinical Prognostic Analysis of Glycolysis-Related Pathways in Hepatocellular Carcinoma
Finalyear project author, Supervisor: Professor Xin Liu *Sep. 2022 – Jun. 2023*

- Identified two glycolysis clusters in Hepatocellular carcinoma (HCC) patients by unsupervised clustering based on Molecular Signatures Database (MSigDB) gene data.
- Defined distinct differences between the two subtypes in immune microenvironment and survival prognosis.
- Constructed a glycolysis-related risk score (GRRS) based on the Cancer Genome Atlas (TCGA) transcriptomic cohort for assessing survival and immune response prognosis with area under the curve (AUC) reached 0.77 for 3-year survival predictions.
- Provided immunotherapy and chemotherapy treatment suggestions for HCC patients based on the prognostic outcomes ofthe GRRS model.

Investigation of Immuno-Oncology Signatures for Clinical Applications
Research Group Member, Supervisor: Dr. Linlin Yan *Jul. 2022 – Aug. 2022*

- Compiled 8 databases about existing immuno-oncology signatures, including MSigDB, TCIA, and TIRSF, and integrated 5 different tumor immune-related computing tools.
- Reproduced an immune-based prognostic score pipeline for ovarian cancer, named IPSOV, utilizing genomic data from 694 samples in the GEO database and categorizing them into 17 immune categories. This model was used to estimate the overall survival rates of ovarian cancer patients; Conducted a literature review of the literature on the use of T-cell receptor analysis as a method for early screening in predicting cancer outcomes.
- Screened and generated T cell receptors (TCRS) specific DNA fragment (CDR3) training data for DeepCAT, a deep learning method for de novo prediction of cancer-associated TCRS.

Recurrence of Article for "A Systematic Approach to Orient the Human Protein-Protein Interaction Network"
Research Assistant, Supervisor: Professor Xin Liu, Jing Li *Mar. 2022 – Apr. 2022*

- Conducted research on the diffusion-based method which was indicated in the article.
- Reproduced pipeline of the diffusion-based method, and constructed oriented human protein-protein interaction (PPI) network with Liver Hepatocellular Carcinoma (LIHC) mRNA count data from The Cancer Genomeengw Atlas (TCGA) using Jupyter Notebook.

PROFESSIONAL EXPERIENCE

Journal of Inner Mongolia Agricultural University (Natural Sciences)
Hohhot, China
Intern Reviewer, Editorial Department *Oct. 2021 – Dec. 2021*

- Translated and edited the English contents; proofread the Chinese and English abstracts for 12 biological-related academic papers.
- Paraphrased biology-related English abstracts on topics such as studies on the activity ofplant extracts.
- Conducted in-depth study on writing Chinese and English academic papers, requirements for abstracts of scientific journals like *Nature* and *Science*, as well as methods for reviewing and proofreading papers.

Nanjing Hongtu Artificial Intelligence Technology Research Institute
Nanjing, China
Intern *Jul. 2021 – Sep. 2021*

- Labeled key points of facial features, and performed machine learning to train facial recognition.
- Applied detection methods for features such as acne and age spots to improve the accuracy of the supervised learning algorithm.

QiLu Pharmaceutical Factory
Jinan, China
Intern, Multiple Departments *May. 2021 – Jul. 2021*
Quality Control Department:

- Measured and recorded the pigment content of the capsule shell and performed the auxiliary work of tablet disintegration and gastric simulated.
- Supported analysis of main components and impurities of anti-cancer drugs by gas and liquid chromatography

Microbiology Testing Department:

- Tested aseptic environment by microorganism cultivation, inspected the presence of microorganisms, configuration culture medium, and assisted in aseptic storage of experimental instruments.

Production Workshop of Biological Anticancer Drugs:

- Participated in the aseptic preparation of microbial initial culture medium and gel filtration chromatography of microbial protein products.

ADDITIONAL INFORMATION

Language: Native in Chinese and Fluent in English (IELTS 7.5 Jan 2024)
Computer: Proficient in R; Intermediate in Python, SQL, JAVA; Basic in MATLAB
Hobby: Calligraphy & Swimming