Zongchao Liu

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EDUCATION

Mailman School of Public Health, Columbia University *New York, USA*
M.S. in *Biostatistics* *Aug. 2019 – May. 2021*
School of Public Health, Shandong University *Jinan, China*
B.S. in *Preventive Medicine, division of biostatistics and epidemiology* *Sep. 2014 – Jun. 2019*
School of Population and Public Health, University of British Columbia *Vancouver, Canada*
Exchange student *Jul. 2017 – Aug. 2017*

SKILLS

Area of Interest: Biostatistics & Data Science, Epidemiology, Bioinformatics, Computational Biology

Knowledge: Statistical Learning, Data Structure and Algorithms, Statistical Inference, Real Analysis, Epidemiology, Biostatistical Methods, Computational Statistics, Biochemistry, Cell Biology, Genetics

Technical: Python, R, SAS, HTML, Neo4j, MATLAB, EpiData, LaTeX, Git version control

Language: Fluently both orally and written in English, Cantonese and Mandarin

RELEVANT WORK EXPERIENCES

Peking University Cancer Hospital & Institute *Jun. 2021 – present*
Research assistant *Beijing, China*

- Conduct independent research on cancer and molecular epidemiology in gastric cancer
- Assist in data analysis and grant proposals preparation

Qingdao Center for Disease Control and Prevention *Feb. 2019 – Jun. 2019*
Staff Intern *Qingdao, China*

- Managed health records of the citizens in Qingdao and assisted in occupational disease assessment meetings
- Assisted in data analysis for investigating on the relationship between occupational factors and women depression and the relationship between tobacco use and occupational diseases

Shandong Qianfoshan Hospital *May. 2017 - Jul. 2017*
Intern staff & physician *Jinan, China*

- Monitored nutritional and health status of patients and collaborated with surgeons in surgeries in obstetrics and urology
- Managed databases for patients' electronic health records and provided data support for researchers

SELECTED PUBLICATIONS AND PRESENTATIONS

- **Liu ZC #**, Wu WH #, Huang S, et al. Plasma lipids signify the progression of precancerous gastric lesions to gastric cancer: a prospective targeted lipidomics study. *Theranostics* 2022; 12(10):4671-4683.
- **Liu ZC #**, Wu WH #, Li ZX, et al. Effect of Helicobacter pylori eradication on blood metabolite fingerprints and their interactions on the progression of gastric lesions: a prospective follow-up study. *Cancer Biology & Medicine*. Accepted.
- **Liu, Z. #,** Lin, Z. #, Cao, W., Li, R., Liu, L., Wu, H., & Tang, K. (2021). Identify Key Determinants of Contraceptive Use for Sexually Active Young People: A Hybrid Ensemble of Machine Learning

Methods. *Children*, *8*(11), 968.

- **Liu ZC,** Li ZX, Zhang Y, Zhou T, Zhang JY, You WC, Pan KF, Li WQ. Interpretation on the report of Global Cancer Statistics 2020. *Journal of Multidisciplinary Cancer Management (Electronic Version),* 7(2): 1-13.
- Zhuang, Z. #, **Liu, Z. #,** Li, J., Wang, X., Xie, P., Xiong, F., ... & Luo, Y. (2021). Radiomic signature of the FOWARC trial predicts pathological response to neoadjuvant treatment in rectal cancer. *Journal of translational medicine*, *19*(1), 1-10.
- Li, X., Zheng, N. R., Wang, L. H., Li, Z. W., **Liu, Z. C.,** Fan, H., ... & Qin, J. (2021). Proteomic profiling identifies signatures associated with progression of precancerous gastric lesions and risk of early gastric cancer. *EBioMedicine*, *74*, 103714.
- Li, W. Q., Qin, X. X., Li, Z. X., Wang, L. H., **Liu, Z. C.,** Fan, X. H., ... & Pan, K. F. (2022). Beneficial effects of endoscopic screening on gastric cancer and optimal screening interval: a population-based study. *Endoscopy*.
- Li, R., Hu, B., **Liu, Z.,** Xu, S., Li, J., Ma, S., ... & Liu, J. (2021). Insight into the effect of hospital-based prehabilitation on postoperative outcomes in patients with total knee arthroplasty: A retrospective comparative study. *Arthroplasty Today*, *10*, 93-98.
- Huo, S., Wang, K., **Liu, Z.,** Yang, Y., Hee, J. Y., He, Q., ... & Tang, K. (2022). Influence of Maternal Exposure to Mass Media on Growth Stunting Among Children Under Five: Mediation Analysis Through the Water, Sanitation, and Hygiene Program. *JMIR Public Health and Surveillance*, *8*(4), e33394.
- **Liu Z.**, Li G., Excess comorbidities associated with autistic spectrum disorder diagnosis in pediatric hospital discharge records. *2021 APHA Annual Conference.*
- **Liu ZC**, Huang S, You WC, Pan KF, Li WQ. Plasma lipids associated with gastric lesion progression to gastric cancer: a prospective lipidomics study. *World Cancer Conference 2022.* Accepted

RESEARCH EXPERIENCE

Department of Mental Health Data Science, NYSPI *Mar. 2020 – present*
Graduate Research Assistant *New York, USA*

- Designed a computational procedure for cleaning and matching controls in customized ratio for the Adolescent Brain Cognitive Development (ABCD) Study
- Conducted experiments with 3D VGG and Resnet structures to predict CBCL-attention score from 3D DTI FA maps under different scenarios
- Embed Model-X knockoff and integrated gradient methods into the predictive model to interpretably select features from diffusion tensor brain imaging data with control of false discovery rate

Department of Epidemiology, Columbia University *Aug. 2020 – present*
Graduate Research Assistant *New York, USA*

- Developed R and SAS scripts to map ICD-10-CM codes into general and sub-level Clinical Classification categories for pediatric inpatients from the Kids' Inpatient Database (KID)
- Developed a procedure to filter patients with diagnosis of Autism Spectrum Disorder (ASD) based on the attained categories. Calculated their comorbidity conditions association (adjusted- and specific- standardized morbidity ratios) with ASD
- Conducted a hierarchical clustering analysis based on time series to differentiate selected patients into different subgroups and investigated on the distributive patterns of the comorbidities within the subgroups

Research Center for Public Health, Tsinghua University *Jul. 2020 – present*
Graduate Research Assistant *Beijing, China*

- Investigated on distributional patterns of Chinese college students' casual sexual relationship (CSR) as well as the associated risk factors, and quantitatively evaluated the risk by combining data of behaviors and attitudes towards CSR

- Conducted clustering analysis to formalize predictors for predicting the occurrence of CSR via gradient boosting machine. Explored and ranked factors of sociodemographic, health behaviors, and awareness in predicting occurrence of CSR by constructing a Bayesian Addictive Regression Tree model
- Provided statistical and programming support in collaborative research on maternal health based on the MICS datasets from the United Nation

Guangdong Institute of Gastroenterology *Jun. 2019 – Aug. 2020*
Research Assistant *Guangzhou, China*

- Developed Python scripts for automatically matching and correcting patients' information, as well as extracting radiomics features from CT, MRI images by customized filters
- Conducted feature selection process and used selected features to build predictive models including random forest, gradient boosting machine, support vector machine to predict the pathological complete response (pCR) in patients with rectal cancer after neoadjuvant treatment

Department of Biostatistics, Shandong University *Jan. 2018 – Jun. 2019*
Research Assistant *Jinan, China*

- Constructed an improved gray model (1,1) to predict the incidence rates of cervical cancer and endometrial carcinoma from 2018 to 2020 in Shandong, verifying other previous prediction of the incidence rates
- Conducted an epidemiology study by presenting the crude, age-standardized and urban(rural) incidence rates of cervical cancer and endometrial carcinoma in Shandong Province, 2013~2017
- Designed and constructed Diabetes Knowledge Graph using Neo4j by coding specific nodes and relationships including the complete process for screening, diagnosis, treatment, and education

RELEVANT COURSEWORK PROJECTS

- **Fragility Index for Clinical Trials**

  A designed online tool for fragility index calculation in meta-analysis research. See **here**

- **A Simulation Study to Compare Two Bootstrapping Methods for propensity-score matching**

  Calculated and compared the variability of the average treatment effects with true variance by propensity score matching method under complex and simple bootstrap scenarios. See **here**

- **Implementation and optimization of algorithms on cancer diagnosis dataset**

  Implement optimization algorithms (Newton Raphson; Gradient Decent; Path-wise Coordinate Descent) on the UCI breast cancer dataset. See **here**

- **Analyses of daily COVID-19 cases across nations**

  Estimated parameters for logistic growth curve by gradient descent; Implemented both Gaussian Mixture Model with EM algorithm and K-means algorithm to cluster the estimated parameters for all the affected countries. See **here**

- **A Bayesian model of hurricane trajectories**

  Implemented regular Metropolis–Hastings algorithm to achieve stationary distribution in Markov Chain; Estimated the parameters and numerical standard errors; Predicted the spatial moving trends and wind speed of the hurricanes. See **here**

HONORS & AWARDS

Outstanding Graduates *2019*
Excellent Student Scholarship *2015-2019*

Member of China Anti-cancer Youth Committee *2018*
Member of the Elite Class, Chinese Academy of Sciences *2018*
Science and Technology Innovation Training Program Funding *2016–2018*
Bronze Award, Information Technology and Entrepreneurship Competition *2017*
First Prize, Shenzhen Cup Mathematical Modeling Competition *2016*