Zian Zhuang

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Education

2022 – 2027 **University of California, Los Angeles** — Los Angeles, CA
Ph.D. Candidate in Biostatistics (expected June 2027) — (GPA: 4.0/4.0)
Advisor: Dr. Gang Li
University Fellowship, 2022–2023, UCLA Graduate Division
The Celia and Joseph Blann Fellowship, 2025–2026

2020 – 2022 **University of California, Los Angeles** — Los Angeles, CA
M.S. in Biostatistics — (GPA: 4.0/4.0)

2015 – 2019 **The Hong Kong Polytechnic University** — Hong Kong, China
B.B.A. (Hons), Financial Services (Minor: Applied Mathematics) — (GPA: 3.6/4.0)

Research Interests

Prediction-powered and semi-supervised inference with machine learning and large language model predictions; causal inference for time-to-event outcomes; survival prediction and model evaluation.

Research Experience

Ph.D. Research, Department of Biostatistics, UCLA — Jun 2022 – Present
Advisor: Dr. Gang Li

Prediction-Powered Cox Regression with Large Language Model Predictions

- Developed a semi-supervised Cox regression method that augments a small labeled sample with black-box predictions, including predictions from large language models, for a larger unlabeled sample.
- Targeted a censoring-free, fixed-horizon Cox projection through inverse probability of censoring weighting, and combined multiple, potentially dependent predictions with matrix weights; showed that, under independent censoring, the estimator's asymptotic variance is no larger than that of the labeled-only estimator, whether or not the Cox model holds.
- Applied the method to NHANES mortality and NACC dementia progression. Manuscript in preparation; Python package in development.

Predictive Performance Evaluation for Survival and Competing Risks

- Proposed time-restricted generalized R^2 and pseudo-R^2 measures for right-censored competing-risk prediction, enabling interpretable assessment of explained variation and model adequacy beyond the C-index, Brier score, and time-dependent AUC.
- Wrote a tutorial on survival prediction performance measures and developed the R package `PAmeasures` (on CRAN), which implements discrimination, calibration and overall accuracy measures for right-censored data, competing risks, and case-cohort and nested case-control designs; compared the measures in simulations varying predictive signal, model misspecification, censoring, sample size and evaluation horizon.

Instrumental Variable Estimation for Censored Outcomes

- Developed a data-adaptive censored two-stage least squares estimator for semiparametric AFT models, improving efficiency, reducing endogeneity bias, and achieving 300+ fold speedups over Bayesian parametric IV methods.

Historical-Control Matching for Clinical Trials

- Designing a historical-control matching framework that combines propensity scores from structured covariates with large language model embeddings of clinical notes to improve patient comparability.

Epidemiological Modeling and Predictive Analysis Aug 2019 – Aug 2021

Advisor: Dr. Daihai He, Department of Applied Mathematics, The Hong Kong PolyU

- Developed an interpretable XGBoost prediction model to identify key predictors of antituberculotic drug-induced liver injury and created an interactive R Shiny web application for clinical risk prediction.
- Built an SEIR model to simulate inter-city SARS-CoV-2 transmission while accounting for underreporting and reporting delays; estimated inpatient and ICU bed shortages under different severity scenarios.
- Applied elastic-net multivariable logistic regression to estimate mortality and ICU long-stay risks, followed by multivariable lognormal regression to predict total hospital length of stay.

Publications

Google Scholar: 1,984 citations; h-index 19 (as of November 2026). †*Equal contribution (co-first authors).*

Methodological Research

- **Zhuang, Z.**, et al. Prediction-Powered Inference for Right-Censored Survival Outcomes. Manuscript in preparation.
- **Zhuang, Z.**, Su, W., Kawaguchi, E., Li, G. Time-Restricted Generalized R^2 Measures for Assessing Predictive Performance in Competing Risks Data. *Biometrics*, in press.
- **Zhuang, Z.**, Zhu, T., Su, W., Dai, X., Li, G. Evaluating Survival Prediction Performance: A Tutorial Using the R Package `PAmeasures`. Submitted to *Statistics in Medicine*.
- **Zhuang, Z.**, Zhou, H., Zhou, J., Li, G. Two-Stage Least Squares Instrumental Variable Estimation for Semiparametric Accelerated Failure Time Models with Right-Censored Data. *Statistics in Biosciences*. 2026.

Collaborative and Applied Research

- Sun, L., Markus, L.F., Sanchez, J.C., Lai, T.J., Lee, E.Q., Li, G., Kim, J., **Zhuang, Z.**, et al. Neoadjuvant PD1 plus CTLA-4 Immune Checkpoint Blockade in Surgically Resectable Recurrent Glioblastoma: A Randomized Surgical Window-of-Opportunity Trial. *Nature Communications*, 17. 2026.
- Barjaktarevic, I., Hixson, R., **Zhuang, Z.**, et al. Longitudinal Outcomes in Pi*MZ Alpha-1 Antitrypsin-Deficient Individuals with Tobacco Smoking History from the SPIROMICS Cohort. *Annals of the American Thoracic Society*, 22(7), 998–1008. 2025.
- Reid, A.M., Bhattacharyya, S., **Zhuang, Z.**, et al. Point-of-Care Ultrasound Evaluation of Diaphragm as a Predictor of Extubation Success in Mechanically Ventilated, Malnourished, End-Stage Liver Disease Pretransplant Candidates: Observational Cohort Study. *Therapeutic Advances in Pulmonary and Critical Care Medicine*, 20. 2025.
- Zhao, Y.†, **Zhuang, Z.**†, Yang, L., He, D. Age-Period-Cohort Analysis and Projection of Cancer Mortality in Hong Kong, 1998–2030. *BMJ Open*, 13(10), e072751. 2023.
- Zhao, S., Cao, P., Gao, D., **Zhuang, Z.**, et al. Modelling COVID-19 Outbreak on the Diamond Princess Ship Using the Public Surveillance Data. *Infectious Disease Modelling*, 7(2), 189–195. 2022.
- Wang, J., Chen, X., Guo, Z., Zhao, S., Huang, Z., **Zhuang, Z.**, et al. Superspreading and Heterogeneity in Transmission of SARS, MERS, and COVID-19: A Systematic Review. *Computational and Structural Biotechnology Journal*, 19, 5039–5046. 2021.

- Musa, S.S., Zhao, S., Hussaini, N., **Zhuang, Z.**, et al. Estimation of COVID-19 Under-Ascertainment in Kano, Nigeria During the Early Phase of the Epidemics. *Alexandria Engineering Journal*, 60(5), 4547–4554. 2021.
- **Zhuang, Z.**†, Cao, P.†, Zhao, S., et al. The Shortage of Hospital Beds for COVID-19 and Non-COVID-19 Patients During the Lockdown of Wuhan, China. *Annals of Translational Medicine*, 9(3), 200. 2021.
- Zhong, T.†, **Zhuang, Z.**†, Dong, X., et al. Predicting Antituberculosis Drug-Induced Liver Injury Using an Interpretable Machine Learning Method: Model Development and Validation Study. *JMIR Medical Informatics*, 9(7), e29226. 2021.
- Cao, P.†, Song, Y.†, **Zhuang, Z.**†, Ran, J.†, et al. Obesity and COVID-19 in Adult Patients with Diabetes. *Diabetes*, 70(5), 1061–1069. 2021.
- Ran, J.†, Song, Y.†, **Zhuang, Z.**†, et al. Blood Pressure Control and Adverse Outcomes of COVID-19 Infection in Patients with Concomitant Hypertension in Wuhan, China. *Hypertension Research*, 43(11), 1267–1276. 2020.
- Ge, J., He, D., Lin, Z., Zhu, H., **Zhuang, Z.** Four-Tier Response System and Spatial Propagation of COVID-19 in China by a Network Model. *Mathematical Biosciences*, 330, 108484. 2020.
- Liu, K., He, M., **Zhuang, Z.**, et al. Unexpected Positive Correlation Between Human Development Index and Risk of Infections and Deaths of COVID-19 in Italy. *One Health*, 10, 100174. 2020.
- He, D., Zhao, S., Xu, X., Lin, Q., **Zhuang, Z.**, et al. Low Dispersion in the Infectiousness of COVID-19 Cases Implies Difficulty in Control. *BMC Public Health*, 20(1), 1558. 2020.
- **Zhuang, Z.**, Cao, P., Zhao, S., et al. Estimation of Local Novel Coronavirus (COVID-19) Cases in Wuhan, China from Off-Site Reported Cases and Population Flow Data from Different Sources. *Frontiers in Physics*, 8, 336. 2020.
- Zhao, S., Gao, D., **Zhuang, Z.**, et al. Estimating the Serial Interval of the Novel Coronavirus Disease (COVID-19): A Statistical Analysis Using the Public Data in Hong Kong from January 16 to February 15, 2020. *Frontiers in Physics*, 8, 347. 2020.
- Ran, J., Zhao, S., **Zhuang, Z.**, et al. Quantifying the Improvement in Confirmation Efficiency of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) During the Early Phase of the Outbreak in Hong Kong in 2020. *International Journal of Infectious Diseases*, 96, 284–287. 2020.
- **Zhuang, Z.**, Zhao, S., Lin, Q., et al. Preliminary Estimates of the Reproduction Number of the Coronavirus Disease (COVID-19) Outbreak in Republic of Korea and Italy by 5 March 2020. *International Journal of Infectious Diseases*, 95, 308–310. 2020.
- **Zhuang, Z.**, Zhao, S., Lin, Q., et al. Preliminary Estimation of the Novel Coronavirus Disease (COVID-19) Cases in Iran: A Modelling Analysis Based on Overseas Cases and Air Travel Data. *International Journal of Infectious Diseases*, 94, 29–31. 2020.
- He, D., Zhao, S., Lin, Q., **Zhuang, Z.**, et al. The Relative Transmissibility of Asymptomatic COVID-19 Infections Among Close Contacts. *International Journal of Infectious Diseases*, 94, 145–147. 2020.
- Zhao, S., Cao, P., Gao, D., **Zhuang, Z.**, et al. Serial Interval in Determining the Estimation of Reproduction Number of the Novel Coronavirus Disease (COVID-19) During the Early Outbreak. *Journal of Travel Medicine*, 27(3), taaa033. 2020.
- Zhao, S., **Zhuang, Z.**, Cao, P., et al. Quantifying the Association Between Domestic Travel and the Exportation of Novel Coronavirus (2019-nCoV) Cases from Wuhan, China in 2020: A Correlational Analysis. *Journal of Travel Medicine*, 27(2), taaa022. 2020.

- Zhao, S., **Zhuang, Z.**, Ran, J., et al. The Association Between Domestic Train Transportation and Novel Coronavirus (2019-nCoV) Outbreak in China from 2019 to 2020: A Data-Driven Correlational Report. *Travel Medicine and Infectious Disease*, 33, 101568. 2020.
- Yang, S., Cao, P., Du, P., Wu, Z., **Zhuang, Z.**, et al. Early Estimation of the Case Fatality Rate of COVID-19 in Mainland China: A Data-Driven Analysis. *Annals of Translational Medicine*, 8(4), 128. 2020.

Preprints and Conference Abstracts

- He, L., Chen, X., Ding, H., Azizad, D., Hoffman, C., Azizi, L., Elezi, G., **Zhuang, Z.**, et al. Design and Biological Activity of a Novel Brain Penetrant Urea Compound Against Glioblastoma. *bioRxiv*. 2025.
- Glassman, L., Buhr, R., Wilgus, M.L., **Zhuang, Z.**, et al. Effect of Smoking Cessation on COPD Exacerbations, Spirometry and Respiratory Symptoms in SPIROMICS. Abstract, American Thoracic Society International Conference. 2024.
- Barjaktarevic, I., Hixson, R., **Zhuang, Z.**, et al. Longitudinal Analysis of Clinical Outcomes in PiMZ Alpha-1 Antitrypsin Smokers from the SPIROMICS Cohort. Abstract, American Thoracic Society International Conference. 2023.

Software

`PAmeasures` (author and maintainer) CRAN — GitHub Link

Unified toolkit for evaluating prediction performance for continuous and survival outcomes, including R^2, L^2, pseudo-R^2, C-index, time-dependent AUC, Brier score and calibration; supports right-censored data, competing risks, and case-cohort and nested case-control designs. Extends the earlier `TimeMetric` package.

`cTSLS` GitHub Link — Web App

Implements a censored two-stage least squares estimator for semiparametric AFT models using Leurgans' synthetic variable method and robust variance estimation. Also includes an AI-assisted Gradio web application for natural-language variable recognition, cTSLS model fitting, diagnostics, and LLM-based result interpretation.

Conference Presentations & Invited Talks

- **Zhuang, Z.**, Su, W., Kawaguchi, E., et al. "Time-Dependent Pseudo-R^2 for Assessing Predictive Performance in Competing Risks Data." Oral contributed presentation, Joint Statistical Meetings, Boston, MA, August 6, 2026.
- **Zhuang, Z.** "Two-Stage Least Squares Instrumental Variable Estimation for Semiparametric Accelerated Failure Time Models with Right-Censored Data." Oral contributed presentation, ENAR 2026 Spring Meeting, Indianapolis, IN, March 17, 2026.
- **Zhuang, Z.** "Two-Stage Least Squares Instrumental Variable Estimation for Semiparametric Accelerated Failure Time Models with Right-Censored Data." Invited seminar, Department of Biostatistics, City University of Hong Kong, Hong Kong, September 2025.

Professional Service

- Session Chair, "Approaches for Measurement Error and Missing Data," Joint Statistical Meetings, Boston, MA, August 6, 2026.

Statistical Consulting and Teaching

Statistician, UCLA Jonsson Comprehensive Cancer Center Jul 2022 – Present

- Provide statistical consulting support as a member of the Biostatistics, Analytical Support & Evaluation (BASE) Unit, contributing to study design, statistical analysis planning and implementation, power and sample size calculation, and interpretation of clinical and biomedical research results.
- Assist with NIH grant applications by drafting statistical analysis plan sections and recommending appropriate statistical methods for proposed biomedical studies.

Statistician, UCLA COPD Program Jul 2022 – Present

- Applied statistical modeling, data visualization, and interpretation to support clinical decision-making and research in chronic obstructive pulmonary disease.
- Collaborated with clinical investigators to summarize findings, interpret model results, and communicate statistical conclusions for biomedical research projects.

Teaching Assistant, UCLA Jan 2023 – Present

- Assisted with Biostatistics courses including Biostat 410 (Clinical Trials), 250A/250C (Ph.D.-level Linear and Multivariate Models), 215 (Survival Analysis), 202A/202B (Mathematical Statistics), and 200C (Generalized Linear Models).

Teaching Assistant, Emory University Jul 2024

- Summer Institute in Statistics and Modeling in Infectious Diseases (SISMID).

Skills & Interests

Programming Skills	R, Julia, Python, Stan, SAS, LaTeX.
Interests	Tennis, Badminton, Table Tennis, Photography.