YUNCHENG HAO

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SUMMARY

PhD student in Statistics with expertise in advanced statistical modeling, clinical trial design, and longitudinal data analysis. Proficient in R, Python, and SAS, with expertise in survival analysis, Bayesian modeling, and longitudinal studies. Strong problem-solving, collaboration, and communication skills, demonstrated through interdisciplinary research and presentations. Eager to contribute to innovative solutions in biostatistics and clinical research.

TECHNICAL SKILLS

Programming	**R** (R markdown, R shiny), **SAS**, **Python**
Modeling	Survival Analysis (lifereg, phreg), Longitudinal Data Analysis (mixed, glimix)
	Bayesian Modeling (Rstan, R2jags), Clinical Trial Design, Adaptive Design;
Simulation	Sample Size Determination, Power Analysis, Model and Design Comparison;
Visualization/Presentation	LaTeX, MS Office, ggplot2 (R), Matplotlib (Python).

EDUCATION

University of Illinois at Chicago   *January 2023 - Present*
PhD in Statistics (Preliminary Exams Passed)   **Expected** *December 2027*
Current GPA: 4.0/4.0

University of Illinois at Chicago   *September 2021 - December 2022*
Master of Science in Statistics
GPA: 4.0/4.0

Southwest University of Political Science and Law   *September 2017 - July 2021*
Bachelor of Economics
GPA: 3.2/4.0

RELEVANT EXPERIENCE

Research Assistant   *January 2023 - May 2024*
Department of Math, Stat, & Comp Sci (MSCS), UIC

- **Predicting Epilepsy in Patients with SAH Using Longitudinal Measurements**

    Duty - Provided statistical expertise, including data analysis, model building, and statistical inference on large and unequally spaced repeated measures data.

    Methodology - Applied advanced statistical methods such as Smoothing Spline ANOVA (R: gss) for identifying potential predictors and Functional Principal Component Analysis and group lasso (R: fdapace, glmnet) for variable selection and prediction.

    Collaboration - Collaborated with a research team at the College of Medicine, UIC. Regularly presented research progress and statistical insights to the team, contributing to collaborative decision-making and project direction. Recognized for high-quality collaboration and the statistical impact on project outcomes.

- **Nonparametric Interaction Selection**

    Duty - Develop a new variable selection and estimation method for the two-way interaction additive model with nonlinear predictors and continuous response.

    Methodology - Utilized b-spline and bivariate spline over triangulation (R: splines, Triangulation, BPST) to approximate main and interaction effects, respectively, and employed a new adaptive group lasso method for basis function selection and coefficient estimation. Conducted simulation studies in R and Python to test and refine methodologies.

    Collaboration - Guided by Prof. Yichao Wu and Prof. Jing Wang in MSCS, UIC. Independently reviewed and synthesized literature to inform model development and improvement while iteratively modifying statistical approaches. Prepared detailed reports, presented findings at weekly meetings with professors, and received feedback and guidance.

RELATED RESEARCH PROJECTS

On Efficiency of Permutation Test in Phase II Trials: Clinical Trial Design *Spring 2022*

- **Goal:** Compare the efficiency of the permutation test with six traditional multi-comparison tests in the context of Phase IIa (PoC) clinical trials.
- **Setup:** Considered clinical trials with five arms and 25 subjects in each arm. Used five candidate models to describe the relationship between dosage and response. Set the placebo effect rate as 0.1 and the maximum dose effect rate as 0.4.
- **Simulation:** Performed 1000 simulations to compare type I error and power of permutation test and six traditional tests (Bonferroni's, Holm's, Hochberg's, Dunnett's, Williams' Trend Test, and Cochran-Armitage Trend Test). The results showed that the permutation test outperformed standard tests in controlling family-wise error rates and maintained considerable statistical power.

Worcester Heart Attack: Survival Data Analysis *Fall 2024*

- **Goal:** Estimate the survival function of patients with acute myocardial infarction and explore the association between survival rate and covariates.
- **Modeling:** Applied Kaplan-Meier estimator, Exponential and Weibull models, and proportional hazards models to analyze the survival/hazard rate of the right censored data. Compared the performance of each model by using the likelihood ratio test or checking the AIC/BIC.
- **Model Selection & Inference:** Used stepwise selection with AIC criterion to select covariates in the proportional hazards model. Interpreted the selected and significant covariates. Estimated the baseline survival function and corresponding mean and median survival rate, and constructed confidence interval on both rates. Tested the proportional hazards assumption by checking significance after add time-dependent covariates.

Riesby's Drug Plasma Levels on Depression: Longitudinal Data Analysis *Fall 2024*

- **Goal:** Examined the association between depressed inpatients drug plasma level and their depression level (HDRS) in longitudinal analysis framework.
- **Modeling:** Implemented mixed-effects models with different random effects and covariance pattern models with different covariance structure to fit the covariates with time effects on continuous HDRS score.
- **Model Selection & Inference:** The information criterion and likelihood ratio test were used to select proper random effect and best covariance structure. And the stepwise selection was used to select fixed effects. And model coefficients were carefully interpreted, and final results were concluded.

AWARDS

Contemporary Undergraduate Mathematical Contest in Modeling	National **Second** Prize (2020)
China Undergraduate Statistical Contest in Modeling	National **Second** Prize (2019)