




Elaine K. Chiu

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SUMMARY

PhD-trained statistician with expertise in statistical methods, evidenced by research awards and submissions to leading journals. Extensive experience analyzing large-scale observational datasets across biomedical and social science settings. Strong computational background in developing reproducible statistical tools in R, Python, and C++. Demonstrated communication skills through cross-functional collaboration and undergraduate- and PhD-level teaching.

SKILLS

Statistics: Causal Inference, Bayesian Inference, Mixed effect model, Survival Analysis

Software: R/Markdown, SAS, C++, Python, Gurobi Optimizer

EDUCATION

University of Wisconsin–Madison

Madison, WI

Ph.D. in Statistics

2021 – Expected 2026

- *Research:* Sensitivity analysis for unmeasured confounding with diverse data types
- *Honor:* IMS Hannan Graduate Student Travel Award (2025), NESS Student Research Award (2025); ICSA Student Paper Award Honorable Mention (2025); IMPS Travel Award (2024)

University of Washington at Seattle

Seattle, WA

M.S. in Statistics

2019 – 2021

National Taiwan University

Taipei, Taiwan

B.A. in Economics (Minor in Political Science)

2013 – 2018

- *Honor:* President’s Award, Future Scholars in Humanities and Social Sciences Scholarship

PUBLICATIONS

Journal Manuscripts

1. **Chiu, E. K.** and Kang, H. (2025). “Exact, Nonparametric Sensitivity Analysis for Observational Studies of Contingency Tables.” *Manuscript*. Under Major Revision at *Journal of the American Statistical Association: Theory and Methods*. *arXiv:* 2507.17207.
2. Heng, S.^{*}, **Chiu, E. K.**^{*}, and Kang, H. (2025). “Towards Robust Matched Observational Studies with General Treatment Types.” *Manuscript*. Under review at *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*. *arXiv:* 2403.14152.

OPEN-SOURCE SOFTWARE

1. **Chiu, E. K.** (2025). `sensitivityIxJ`: Exact nonparametric sensitivity analysis for $I \times J$ contingency tables. *CRAN*. cran.r-project.org/package=sensitivityIxJ.

WORK

Ph.D. Researcher

May 2022 – Present

EXPERIENCE

Department of Statistics, University of Wisconsin–Madison, Madison, WI

Project: Sensitivity Analysis for Unmeasured Confounding with Categorical Data

- **Optimization-based sensitivity modeling:** Develop a constrained optimization framework that computes the upper bound of the p-value under unmeasured confounding, generalizing sensitivity analysis from binary to multi-category discrete treatments and outcomes.
- **Efficient algorithms:** Design hypothesis testing via exact finite-population inference, asymptotic approximations, and stochastic sampling to balance validity and computation.
- **Multiple testing:** Construct procedures controlling family-wise error while retaining power for overall and subgroup treatment effect detection.
- **Software:** Build an R package with C++ and Python backends implementing categorical sensitivity analysis.
- **Applied impact:** Analyze ECLS-K data, showing robust positive effects of center-based prekindergarten on kindergarten math achievement with gender heterogeneity under unmeasured confounding.
- **Scholarly output:** Resulted in a manuscript under major revision at *Journal of the American Statistical Association (Theory & Methods)*.

Research Collaborator

Sep 2023 – Sep 2025

Department of Biostatistics, New York University, New York, NY

Project: Sensitivity Analysis for Unmeasured Confounding with Continuous Data

- **Optimization-based sensitivity modeling:** Formulate sensitivity analysis for continuous treatments as a optimization problem to obtain p-value bounds under unmeasured confounding, motivated by applications in air pollution exposure and medication dosing.
- **Power theory:** Derive large-sample power metrics (design sensitivity, Bahadur efficiency) to guide the selection of powerful test statistics under unmeasured confounding.
- **Dose–response insight:** Characterize how test-statistic power depends on treatment dose–response structure via targeted simulation studies.
- **Applied impact:** Analyze NHANES data, identifying adverse effects of environmental tobacco smoke exposure on pulmonary function robust to unmeasured confounding.
- **Scholarly output:** Resulted in a manuscript under review at *Journal of the Royal Statistical Society: Series B*.

Teaching Assistant

Sep 2021 – Present

Department of Statistics, University of Wisconsin–Madison, Madison, WI

- **Instruction:** Deliver R-based labs and discussion sections reinforcing core statistical concepts in undergraduate and PhD-level courses.
- **Student support:** Provide office-hour guidance and targeted feedback on modeling, computation, and interpretation.
- **Project mentoring:** Advise student teams on data analysis workflows, including data cleaning, analysis planning, reproducible reporting, and presentations.

PODIUM
PRESENTATIONS

- **Joint Statistical Meetings** 2025
Exact Sensitivity Analysis for Observational Studies of $I \times J$ Contingency Tables
- **International Chinese Statistical Association Applied Statistics Symposium** 2025
Exact Sensitivity Analysis for Observational Studies of $I \times J$ Contingency Tables
- **New England Statistics Symposium** 2025
Exact Sensitivity Analysis for Observational Studies of $I \times J$ Contingency Tables
- **Society for Research on Educational Effectiveness Annual Conference** 2024
Strengthening Causal Claims in Educational Studies: A Sensitivity Analysis Approach
- **International Meeting of the Psychometric Society** 2024
Strengthening Causal Claims in Educational Studies: A Sensitivity Analysis Approach
- **American Causal Inference Conference** 2024
Sensitivity Analysis with Likelihood-Ratio and Pearson's Chi-Square Tests for $I \times J$ Tables

INVITED
LECTURES

- **Institute of Public Affairs, National Taiwan University, Taipei, Taiwan** 2024
Bootstrapping Methods: Drawing Inference with Machines

REFERENCES

Hyunseung Kang

Associate Professor, Department of Statistics, University of Wisconsin–Madison

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Siyu Heng

Assistant Professor, Department of Biostatistics, New York University

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Sam Pimentel

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