Geonwoo Kim

Department of Economics, University of Chicago
5757 S. University Ave., Chicago, IL 60637
kimgeonwoo@uchicago.edu geonwoo-patrick-kim.github.io

Education

Grinnell College 2019–2024
B.A. in Mathematics with Honors, Concentration in Statistics

Research Interests

Econometric Theory: Semiparametric and High-Dimensional Inference, Measurement Error, Inference with LLM-Generated Variables
Labor Economics: Technological Change, Wage Inequality, Education

Working Papers

Inference on Treatment Effects with Repeatedly Mismeasured High-Dimensional Controls
1st Author, with Suyong Song
Under review at *Journal of Econometrics*.

Denoised Partial Correlation for Conditional Independence Tests under Noisy Confounders
1st Author, with Suyong Song and Jonathan Wells
Under revision.

Signal Space Conjugate Gradient Iterative Hard Thresholding
1st Author, with Kate Bartz and Jeffrey Blanchard
Under review at IEEE Transactions on Signal Processing

Research in Progress

Validation Sampling for Regressions with Aggregated AI Labels
Research in progress.

Adaptive Efficiency under Growing Propensity-Score Complexity
Research in progress.

Research Experience

Research Professional July 2025–Present
University of Chicago, Department of Economics

The Identifying Power of an Assumption: Comparing Sharp Identified Sets under Linear Restrictions
PIs: Edward Vytlacil, Azeem Shaikh, Yuehao Bai, and Shunzhuang Huang
Studied how alternative assumptions affect identified bounds in instrumental-variable models with ordinal outcomes. Independently verified the cases of 7 and 8 outcome categories using exact linear-programming certificates. Beyond the assigned computations, derived a general representation of the identified-set lower bound and proved that the minimum number of affine functions needed to represent it is $(K-1)(3K-4)/2$, where K is the number of outcome categories.

Inference for Linear Systems with Unknown Coefficients
PIs: Yuehao Bai, Kirill Ponomarev, Andres Santos, Azeem Shaikh, Max Tabord-Meehan, and Alexander Torgovitsky
Worked on tests of whether observed data are consistent with large systems of linear restrictions in partially identified models, including systems with estimated coefficients. Built the R/Gurobi implementation, using sample splitting and linear programming to select directions for detecting violations of the restrictions. Implemented influence-function standard errors accounting for estimated projection matrices without constructing large Kronecker-product covariance matrices. Conducted Monte Carlo experiments in treatment-effect and shape-constrained nonparametric instrumental-variable models, including high-dimensional systems with up to 500 restrictions.

Inference for Policy Learning and Optimal Welfare
PIs: Kirill Ponomarev and Vira Semenova
Implemented least-favorable and generalized moment selection (GMS) procedures for constructing lower confidence bounds on the maximum expected welfare attainable over a class of policies. Diagnosed numerical instability and nearly "treat-all" optimal rules in the original simulations, and developed alternative designs with competing policies of similar welfare to better isolate the paper's inferential difficulties. Audited the revised manuscript's proofs and simulation code, reproduced its main numerical results, and identified discrepancies between the welfare target used to evaluate coverage and the estimand implied by the resampling design, as well as problems in variance accounting and benchmark confidence-level calibration.

Testing Exclusion and Shape Restrictions in Potential Outcomes Models
PIs: Hiroaki Kaido and Kirill Ponomarev
Worked on tests of whether observed treatment-outcome data are consistent with exclusion and shape restrictions in potential-outcomes models. Reproduced the linear-programming-based tests and bootstrap inference calculations. Traced discrepancies in a bootstrap tuning parameter to different empirical-quantile conventions, reconciled the numerical results across implementations, and prepared a verified R implementation.

Undergraduate Researcher August 2024–December 2024
Grinnell College, Department of Statistics | Advisor: Jonathan Wells
Co-developed a permutation-based conditional-independence statistic under noisy confounders using random-matrix and representation-theoretic structure. Formulated a rank-mismatch empirical-risk procedure, optimized the R implementation, and conducted Monte Carlo experiments.

Research Collaborator August 2023–Present
University of Iowa Tippie College of Business | Collaborator: Suyong Song
Led and wrote a manuscript on high-dimensional inference with measurement error, including its theoretical arguments and proofs, Monte Carlo experiments, and an empirical application. Derived the first-order influence-function correction for replicate-estimated, non-diagonal measurement-error covariance and developed uniform asymptotic results under high-dimensional nuisance-rate conditions. Implemented and numerically certified the high-dimensional nuisance estimation pipeline, investigated finite-sample coverage failures, and prepared the replication materials.

Undergraduate Researcher May 2023–Dec 2024
Grinnell College, Department of Mathematics | Advisor: Jeffrey Blanchard
Co-developed Signal Space Conjugate Gradient Iterative Hard Thresholding for sparse recovery in redundant dictionaries. Led substantial later-stage theoretical reconstruction and D-RIP proof auditing, incorporated near-optimal projection, and drove large-scale phase-transition experiments, benchmarking, reproducibility, and submission preparation.

Research Assistant March 2022–March 2024
Seoul National University, Department of Operations Research | PI: Song-Hee Kim
Studied the causal effect of a shift-choice system on nurse turnover and service quality using hospital administrative records. Constructed a nurse-month panel, inferred staggered treatment timing from scheduling patterns, and supported generalized difference-in-differences, event-study, robustness, and sensitivity analyses.

Research Assistant February 2019–June 2019
Science and Technology Policy Institute, South Korea | PI: Minhyung Lee
Conducted policy research on cross-institutional public R&D collaboration networks. Analyzed network structure across government laboratories, universities, and industry. Implemented graph-based methods to identify institutions mediating innovation diffusion.

Teaching Experience

Probability Theory, Course Mentor, Grinnell College — Fall 2024
Intermediate Microeconomics, Course Grader, Grinnell College — Fall 2024
Statistical Learning, Course Mentor, Grinnell College — Spring 2024
Econometrics, Course Mentor, Grinnell College — Fall 2023, Spring 2024

Service and Leadership

President, Korean Students Association, Grinnell College — 2022–2023
Squad Leader and Drill Sergeant, Republic of Korea Army — 2020–2022

Computing and Languages

Computing: Python, C++, R, MATLAB, Stata/Mata, LaTeX, Git.
Languages: Korean (native), English (fluent), German (intermediate).