Yoon Choi

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EDUCATION

University of Washington — Seattle, WA
Ph.D. in Economics — Jun. 2026 (Expected)

Georgia State University — Atlanta, GA
M.S. in Mathematics and Statistics

Korea University — Seoul, South Korea
B.A. in Spanish Language and Literature

RESEARCH INTEREST

Field of interest: (Convex) Optimization, Distributionally Robust Optimization (DRO), Network Estimation, Causal Inference, Numerical Simulation, High Performance Computing (HPC)

RESEARCH EXPERIENCE

· **Working Paper**

- **Variational Bilevel Estimation for Exponential Random Graph Models *(Job Market Paper)***

  I propose an estimation algorithm for the Exponential Random Graph Model (ERGM), a popular statistical network model for estimating the structural parameters of strategic network formation in economics and finance. Existing methods often produce unreliable estimates of parameters for the triangle, a key network structure that captures the tendency of two persons with shared friends to connect. Such unreliable estimates may lead to untrustworthy policy recommendations for networks with triangles. Through a variational mean-field approach, my algorithm addresses the two well-known difficulties when estimating the ERGM, the intractability of its normalizing constant and model degeneracy. In addition, I introduce ℓ_2 regularization that ensures a unique solution to the mean-field approximation problem. I provide a non-asymptotic convergence rate analysis for my proposed algorithm under mild regularity conditions. Through Monte Carlo simulations, I demonstrate that my method achieves 100 % sign recovery rate for triangle parameters for small and mid-sized networks under perturbed initialization, compared to 50 % rate for existing algorithms. I provide the sensitivity analysis of estimates of ERGM parameters to hyperparameter choices, offering practical insights for implementation.

· **Work in Progress**

- **Wasserstein Distributionally Robust Estimation in Linear Quantile Regression with Missing Data (with Yanqin Fan and Gaoqian Xu)**

  This paper proposes a Distributionally Robust (DR) linear quantile estimator to handle deviations from the "Missing At Random"(MAR) assumption in incomplete data. While MAR-based estimators can perform poorly when the missingness mechanism deviates from MAR, fully assumption-free approaches yield overly conservative bounds. To address this, we introduce a distributionally robust optimization framework using the Wasserstein distance to measure departures from the MAR distribution. The estimator solves a minimax optimization problem by maximizing the worst-case expected loss over a Wasserstein ball and minimizing it with respect to the parameter of interest.

- **Sensitivity Analysis of Treatment Effect and Spillover Effect under Partial Interference**

  This paper introduces the Interference Sensitivity Model (ISM), a novel approach to assess the sensitivity of causal effects in network settings under unobserved confounding and partial interference, which allows for interactions within clusters but not across clusters. The ISM provides credible bounds for Average Direct Effects (ADE) and Average Spillover Effects (ASE) by maximizing a constrained geometric programming, which is a non-convex optimization problem.

- **Generalization of Variational Bilevel Estimation for Exponential Random Graph Model: $\alpha-$divergence**

- **Variational Bilevel Estimation for Exponential Random Graph Model under Weak Convexity**

- **Variational Bilevel Estimation under Global Dependence Network Topologies**

TEACHING INTEREST

- Econometrics: Introduction to Econometrics, Advanced Econometrics, Computational Methods, Machine Learning for Economics
- Microeconomics: Principles of Microeconomics, Intermediate Microeconomics
- Macroeconomics: Principles of Macroeconomics, Intermediate Macroeconomics
- Statistics: Elementary Statistics, Business Statistics, Data Analysis
- Other: Mathematical Economics, Scientific Computing, Business Analytics

TEACHING EXPERIENCE

Department of Economics, University of Washington Seattle, WA

- Sole Instructor
  - ECON 382 *Introduction to Econometrics* (Asynchronous) Summer 25
  - ECON 382 *Introduction to Econometrics* (In-person) Autumn 23
  - ECON 201 *Introduction to Macroeconomics* (In-person) Winter 22, Spring 22
  - ECON 200 *Introduction to Microeconomics* (In-person) Autumn 22
- Teaching Assistant
  - ECON 382 *Introduction to Econometrics* (In-person) Autumn 21, Winter 23, Spring 23
  - ECON 201 *Introduction to Macroeconomics* (Online) Spring 20, Autumn 20, Winter 21
  - CS & SS 221 *Statistical Concepts and Methods for the Social Sciences* (Online) Spring 21

Foster School of Business, University of Washington Seattle, WA

- Teaching Assistant
  - SCM 530 *Managing And Mining Big Data* Autumn 25
  - IS 460 *System Analysis* Spring 24, Winter 25, Spring 25
  - IS 300 *Introduction to Information System* Winter 24, Autumn 24
- Grader
  - OPMGT 565 *Business Analytics-Tools For Big Data* Autumn 25
  - MSIS 524 *Managing Information Technology Projects* Spring 24, Autumn 24, Autumn 25
  - MSIS 550 *Leadership Series* Spring 25

Department of Mathematics and Statistics, Georgia State University Atlanta, GA

- Teaching Assistant
  - MATH1401 *Elementary Statistics*

SKILLS

Software R (`ergm, statnet, optim, ggplot`), Python (`Pytorch, Rpy2`), Fortran, MATLAB, MySQL, Tableau
Language Korean (Native), English (Fluent), Spanish (Fluent, with DELE C1), Japanese (Basic)

WORKING EXPERIENCE

United Nations Economic Commission for Latin America and the Caribbean Santiago, Chile
Sep. 2014 – Feb. 2015

· Constructed database about value-added tax in countries of Latin America
· Analyzed the effect of fiscal reform in Hondras in 2013 with Micahel Hanni

SERVICE

Korea Military Service Seoul, South Korea
Aug. 2009 – Aug. 2011

· Military Occupational Specialty: Infantry

REFERENCE

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