STATEMENT OF ACADEMIC PURPOSE

Kenny Guo, Prospective Economics PhD

I have developed a deep appreciation for economics research, having seen its diverse, critical implications in policy, rooted in its theory-rich foundations. My research interests lie within **microeconomics** and **econometrics**, and I wish to pursue an Economics PhD at Yale to apply research skills and state-of-the-art models to current issues in policy and technology alongside incredible, decorated faculty.

As an undergraduate at UCLA, I thrived in the formality of math, taking coursework in honors real analysis (top five in class), honors linear algebra, optimization, stochastic processes, differential equations, probability theory, and statistics. However, I was most engaged in applying these tools for economic analysis, whether using optimization in micro theory, statistics for prediction in econometrics, or Brownian motion for mathematical finance. Furthermore, I supplemented my studies with computing courses, taking coursework in Python and machine learning to prepare for hands-on research experience.

My early experiences solidified my interest in **applied microeconomics,** particularly public and labor economics. Intrigued by the national debates on crime, I began as a research assistant under Professors Felipe Goncalves and Emily Weisburst, studying the economics of crime. I helped assemble the most comprehensive US crime database, carrying out empirical tasks ranging from data management to Python scripting, and ultimately developed a passion for public economics, utilizing microeconomic models and statistics to rigorously study policy and behavior. At the start of this year, I also joined the Labor Team at the California Policy Lab led by Professor Till von Wachter, where I was honored to be one of four undergraduates funded by the Economics Research Fellows Scholarship. I led a report studying inflation's impact on the US unemployment insurance (UI) program, where, through running regressions, designing interactive figures, and presenting my work to the UCLA Board of Visitors, I found importance in labor research and communicating findings that could help millions of workers and families at their critical moments.

Going forward, I am interested in pursuing related empirical questions. The canonical Becker model of crime (1968) implies that increased detection probability can deter crime; however, one trend often overlooked in this regard is victim reporting, which might hinder detection if officials are mistrusted by the public. I aim to build on immigration enforcement policy studied by Goncalves et al. (2024), asking if recent actions and increases in deportation policy similarly affect the reporting and victimization trends of immigrant demographics. Regarding UI policy, Anderson and Meyer (1997) found a positive relationship between benefit levels and take-up rate, with our report at CPL studying inflation reinforcing this by finding a positive relationship between *real* benefit levels and UI reach. However, the other, less-studied key policy lever for UI is the minimum earnings threshold (MET). How has inflation eroded the MET, and how might changes in the real MET incentivize worker entry into the UI program? Together with the negative effects of inflation on benefit levels and UI adequacy in states with out-of-date policy,

this could form a clearer model with both benefit levels and MET for policymakers to make UI a more effective social safety net.

More recently, my research interests also include **econometrics** and **game theory**, particularly with respect to machine learning. This summer, I interned at NERA Economic Consulting on the Finance team under Dr. Jordan Milev. I worked on derivative mispricing models and share-price cointegration disputes, where I examined how weak correlation modeling and market shocks translated into measurable economic damages. I also researched IPO performance and litigation, experimenting with machine learning methods such as polynomial regression and random forests to predict optimal trading windows and settlement outcomes. In a related vein, together with colleagues at UCLA Mathematics, we started an organization called BruinML, where we collaborate with academics to broadly research topics in machine learning, such as improving algorithms, bandits, MDPs, or continuous control. I naturally find excitement in projects at the intersection of economics and computer science, particularly with respect to (multi-agent) decision making. I have initiated projects studying algorithmic game theory, auction mechanisms, and information-asymmetric learning, and recently, submitted a paper to *AISTATS* that develops an algorithm and proves convergence to equilibrium in Stackelberg Markov games, opening up applications in dynamic online marketplaces or human-AI collaborative environments.

I am fascinated by the extensive applicability of ML frameworks to many microeconomic questions. Going forward, I am particularly interested in human-AI interaction. Together with Dr. Goran Radonovic from MPI, we currently study multi-agent counterfactual effect decomposition, with applications towards human-AI workplaces and how joint decisions between workers and LLMs affect outcomes. With the rise in algorithmic policing, I also want to extend this multi-agent framework to that of Chalfin and Goncalves (2025), modeling how police working with AI input affects the quality and quantity of arrest decisions. Furthermore, many micro theory models can be adapted smoothly into learning problem frameworks. One line that interests me is integrating the rationally-inattentive individual framework (Bloedel and Segal, 2021) with my previous Stackelberg game work to study how an algorithmic agent might maximize objectives such as user engagement on online platforms. Athey and Luca (2019) outlined the empirical and strategic toolset for tech-oriented economists, and I believe their insights will continue to be crucial in many ways for effective and safe policy in the upcoming stage of AI and its future.

Yale's Economics Department offers one of the strongest environments for rigorous micro and econometrics research, and as a PhD student, I would love to work with Professor Yuichi Kitamura on topics such as computational algorithms for various econometric problems, as well as with Professor Navin Kartik on game-theoretic learning problems. I am especially drawn to Professor Dirk Bergemann's pioneering research in the economics of LLMs and LLM-based multi-agent models, which aligns closely with my current work and interests in algorithmic decision making. Altogether, I hope to merge my passion for policy-relevant micro research with my theoretical interests in machine learning and technology en route to an academic career. Thank you for your consideration.