Diana Yilun Zhu
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550 Chimalus Drive, Palo Alto, CA 94306
617-981-0034

Dear Committee,

My name is Diana Yilun Zhu. I am a third-year Economics PhD Candidate at Yale University, currently a visiting scholar at Stanford Economics Department and the Graduate School of Business. I am writing to apply for the Health Economics Research Boot Camp hosted at NBER. My recommender is Professor Susan Athey at Stanford Graduate School of Business. She can be contacted at athey@susanathey.com.

Best regards,
Diana Y. Zhu

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EDUCATION

Stanford University — **Cambridge, MA**
Visiting Scholar at Economics Department and GSB — Sep 2019—Expected May 2020

Yale University — **Cambridge, MA**
PhD Candidate in Economics — Sep 2017—Expected May 2022
Research Interests: Industrial Organization, Healthcare Economics, Public Finance
Relevant Graduate Coursework: Macroeconomics, Microeconomics, Econometrics, Industrial Organization, Public Finance, Labor Economics, Causal Inference, Machine Learning

Harvard College — **Cambridge, MA**
B.A. in Applied Mathematics — Sep 2012—May 2016
Magna Cum Laude, Highest Honors

Work in Progress

Who Shall I Assign Thee? Evaluating Physician-Patient Match Effect in Chronic Care

Healthcare Access Inequality and Optimal Equilibrium Distribution of Radiation Facilities

Tradeoff between Financial Affiliation and Patient Welfare: Evidence from Surgery Referral Decisions in Ambulatory Surgical Centers, Joint with Susan Athey

Targeting the Yield and Medical Guideline Adoption, Joint with Jason Abaluck and Leila Agha

RELATED EXPERIENCE

Yale School of Management — **New Haven, CT**
Research Assistant for Prof. Jason Abaluck — June 2017—Present

Yale Department of Economics — **New Haven, CT**
Research Assistant for Prof. Yusuke Narita — June 2018—September 2018

Natixis — **New York, NY**
Graduate Analyst in Currency Trading Department — Jul 2016—May 2017

National Bureau of Economic Research — **Cambridge, MA**
Research Assistant for Prof. Kenneth S. Rogoff — Mar 2014—May 2016

Harvard Economics Department — **Cambridge, MA**
Research Assistant for Prof. Elhanan Helpman — Jul 2015—May 2016

Herchel Smith Harvard Undergraduate Summer Science Research Program — **Cambridge, MA**
One of 40 Harvard Students Selected to Pursue Full-Time Summer Research — Jul 2015—Sep 2015

SKILLS

Languages: English (native), Chinese (native)
Proficiency in Matlab, Stata and Python, SAS
Familiarity with Java, R, SQL

Reasons for Attending the Boot Camp

I am a third-year economics PhD at Yale studying Industrial Organization and Healthcare Economics. This boot camp is an unparalleled opportunity for my personal and professional growth. In fact, the theme of this boot camp aligns perfectly with my research interests, which lies in the intersection of health, IO and behavioral economics. For my research, I bring tools in IO and labor economics to study the decision-making process of players in the healthcare industry, and investigate how welfare-improving policies could influence such decisions.

To be specific, my research is divided into two parts—one strand aims to break down the observed variation in patient outcome to (1) variation in physician style and (2) the match effect between physicians and patients (3) patient variation. One of my current projects studies the impact of variation in physician treatment style on patient outcome in a chronic care setting. I then investigate why certain types of patients when matched with certain types of doctors, generate better outcome. My co-authored work with Jason Abaluck at Yale School of Management examines the value of medical second opinion. Another project of ours investigates whether doctors are heterogeneously targeting the right patients to treatment and whether these "better" doctors also are the ones that are prone to respond to guidelines, which has distributional consequence for the introduction of guidelines. My co-authored work with Susan Athey at Stanford Graduate School of Business studies the impact of physician financial affiliation on their referral decision, which is a complex decision-making process based on patient observable and unobservable.

The other direction of my research aims to study how travel reimbursement for disadvantaged patients could improve access to healthcare resources and in equilibrium, how that impacts the distribution of entry and location choice of radiation facility locations.

I would be extremely grateful for the opportunity to learn and interact personally with the giants in the field, the organizers and speakers of this boot camp. In fact, their works inspire and serve as foundation for my own research. For example, Professor Ben Handel's work on consumer choice of healthcare insurance and his findings about the behavioral biases of consumers first introduced me to thinking about healthcare economics in a behavioral way. A series of papers by

Professor Jonathan Kolstad that study the decision-making of surgeons as well as Professor Amy Finkelstein's work on the variation of provider treatment style inspired me to study the provider treatment style variation in chronic care setting, and later, to study the match effect between doctors and patients. The bargaining framework introduced in Ho and Lee (2016) is one of the building blocks for my research on the underentry problem of radiation facilities. Listening to their talks and current research would ground me in the latest developments and the direction this field is moving towards.

Through the boot camp, I sincerely look forward to discussions about research, data and literature with other fellow PhD students from various schools, which would undoubtedly broaden my mind and sparkle new ideas. I strongly believe in the value of exchanging ideas with scholars outside the everyday circle—each school likely takes different approaches to study the same subject. During my current visit year at Stanford, I strongly sensed the difference in the preferred research methodology and topics, and therefore am able to better appreciate the opportunity to learn from a diverse set of environments. Such discussions with scholars from different backgrounds could often reveal novel angles to look at a question, innovative solutions, as well as new tools and settings to study the topic of interest. This boot camp would likely nurture long-term collaborative relationships that would give birth to extremely fruitful future work.

Lastly, it would be an extremely precious opportunity to get feedback on my own works—whether it is going towards a fruitful and important direction, potential problems I have not considered, whether there are other interesting factors I should dig into. This is especially important since most of my own work are still at a relatively early stage. And given the datasets I have, I hope to find scholars that share similar interests to pursue collaborative work in the future.

Please let me know if there is any other material I could provide and I sincerely look forward to the potential opportunity to participate in the boot camp.

Yale SCHOOL OF MANAGEMENT

JASON ABALUCK
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October 14th, 2019

Jason Abaluck
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To Whom It May Concern,

Diana Zhu is a third-year PhD student at Yale. She is a fantastic researcher with tremendous drive and several exciting projects in progress. We have been talking regularly since April, 2017 when she was admitted to the program.

Diana's job market paper involves studying physician-patient matching. It is hard to change physician behavior. You can change how they are reimbursed, you can subsidize them to refer to less expensive doctors, you can change patient cost-sharing, but at the end of the day, these changes will make a marginal difference. What might make a huge difference is assigning the sickest patients to doctors who tend to treat a given patient more inexpensively (while maintaining quality). In other words, some patients will cost the same no matter who you assign them to. Some will be vastly more expensive at some physicians than others. In many settings, patients don't have preferences over physicians – instead, patients are assigned to the first physician with an opening on the relevant date, although in many cases, other physicians are available on equally short notice. This suggests there might be large savings available from optimal matching without sacrificing much on other dimensions. Nonetheless, to date, this question has only really been investigated by public health researchers.

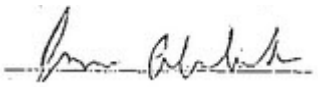
Through her coursework and independent research, Diana is becoming an expert on the matching literature, and I think she is just the right person to apply this set of technical tools to an important and overlooked problem. She is analyzing this question in the context of VA electronic medical records which I think will be a terrific dataset for this project (patients are assigned to physicians based on quasi-random scheduling).

Diana and I are also jointly working on several projects. Building on her job market paper, we are partnering with healthcare start-up Nuna to randomize patients to physicians based on an algorithm Nuna developed to project savings from alternative patient-physician matches. Secondly, with Leila Agha and David Chan, we are studying physician guidelines for Warfarin administration using a combination of Veterans Administration administrative records and a large database of Warfarin randomized trials. This unique dataset allows us to assess not only whether physicians respond to guidelines (our results suggest that they do), but whether guidelines lead physicians to

administer better treatment according to the randomized trial model, or whether they lead to "cookbook medicine" where physicians focus on the guidelines to the exclusion of other potentially relevant variables. Asking this question requires synthesizing all the information in randomized trials, and Diana has done the bulk of the work estimating "causal forest" models on the trial data in order to determine our best estimates of treatment effects as a function of all available data.

Diana is extremely smart, she has strong math skills, a background in computer science and above all – and I can't emphasize this enough – she gets things done. Since she started as a grad student, she has consistently followed up with me and consistently made progress. Diana has all the qualities I believe are most predictive of success in our profession. I expect that she will be very influential and you should admit her to the behavioral health program.

Sincerely,



Jason Abaluck
Associate Professor of Economics
Yale School of Management