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To
NBER Research Associates

January 21, 2022

Thank you for your time on my application.

I am writing to apply for attending the Innovation Research Boot Camp (IBRC) organized by NBER in Cambridge, MA in July 2022.

My recommendation letter writer is my academic advisor Prof. Michael Smith (Email: mds@cmu.edu) at Carnegie Mellon University.

Curriculum vitae and my application essay are attached in this package. I look forward to hearing from you, and do not hesitate contacting me if you have any questions.

Thanks in advance!

Helen Shuxuan Zeng

Attachment: CV, Essay

Helen Shuxuan Zeng

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Education

2018–Now	**Carnegie Mellon University**	Pittsburgh, PA
	Ph.D. in Information System & Management	
2016–2018	**Columbia University**	New York, NY
	M.A. in Quantitative Methods in the Social Sciences (Data Science Concentration) GPA: 3.87/4	
2012–2016	**The University of Hong Kong**	Hong Kong
	Bachelor of Science, Mathematics & Statistics	

Selected Honours and Awards

2021	NBER Digitization Fellow
2020	K&L Gates Presidential Fellow, Carnegie Mellon University [Link]
2020	Suresh Konda Memorial Award for Best First Paper, Carnegie Mellon University
2018	Carnegie Mellon University Heinz College PhD Fellowship
2016	HKU CEDARS Student Services Awards, the University of Hong Kong
2014	CV Starr Scholarship, the University of Hong Kong

Academic Articles

[1] ”Internet Governance Through Site Shutdowns: the Impact of Shutting Down Two Major Commercial Sex Advertising Sites” [Link]
Authors: **Zeng, HS.**, Smith, M. & Danaher, B.
Outlet: Under review at Management Science (Fast Track)

[2] ”Exploring Polarization of Users Behavior on Twitter During the 2019 South American Protests” [arXiv]
Authors: Villa-Cox, R., **Zeng, HS.**, KhudaBukhsh, AR. & Carley, KM.
Outlet: Proceedings of IC2S2 2021, 7th International Conference on Computational Social Science

[3] "The Where, When, and Why of Movie Piracy."
Authors: **Zeng, HS.**, Huang, Y., Burtch, G.& Smith, M.

Papers in Conference Programs

[1] **Zeng, Helen (Shuxuan)**, Michael D. Smith, Brett Danaher. 2021. Internet Governance Through Site Shutdowns: the Impact of Shutting Down Two Major Commercial Sex Advertising Sites. 2021 Conference on Information Systems and Technology (CIST), Newport Beach, California, October 23 & 24.

[2] Villa-Cox, Ramon, **Helen Shuxuan Zeng**, Ashiqur R. KhudaBukhsh, Kathleen M. Carley. 2021. Exploring Polarization of Users Behavior on Twitter During the 2019 South American Protests. 7th International Conference on Computational Social Science (IC2S2), ETH Zurich, Switzerland, July 27-31.

[3] **Zeng, Helen (Shuxuan),** Brett Danaher, Michael D. Smith. 2021. Human-Trafficking and Internet Governance: Measuring the Effect of the FOSTA-SESTA Law. National Bureau of Economic Research (NBER) Summer Institute, Economics of IT and Digitization Workshop, Cambridge, Massachusetts, July 22-23.

[4] **Zeng, Helen (Shuxuan)**, Michael D. Smith, Brett Danaher. 2021. Internet Governance Through Site Shutdowns: the Impact of Shutting Down Two Major Commercial Sex Advertising Sites. The National Center on Sexual Exploitation, Coalition to End Sexual Exploitation Online Global Summit, July 20-24.

[5] **Zeng, Helen (Shuxuan)**, Brett Danaher, Michael D. Smith. 2020. Internet Governance Through Site Shutdowns: Measuring the Effect of the FOSTA-SESTA Anti-Tracking Law. 2020 Workshop on Information Systems and Economics (WISE), December 16-19.

[6] **Zeng, Helen (Shuxuan)**, Brett Danaher, Michael D. Smith. 2020. Unintended Harms or Reduction in Trafficking? Measuring the Impact of US' Anti Sex Trafficking Law FOSTA-SESTA. IBM Corporate Social Responsibility, the Traffik Analysis Hub Global Analysts Meeting, July 17th.

[7] **Zeng, Helen (Shuxuan)**, Brett Danaher, Michael D. Smith. 2020. Does Shutting Down Internet Advertising Portals for Prostitution Affect Violence Towards Women? Sixteenth Symposium on Statistical Challenges in Electronic Commerce Research (SCECR), June 18-20.

[8] **Zeng, Helen (Shuxuan)**, Michael D. Smith, Brett Danaher. 2019. Fighting Sex Trafficking in the Digital Age: Analyzing the Impact of FOSTA/SESTA. Center for the Protection of Intellectual Property, Copyright Research Symposium: Safe Harbors and Private Ordering in the Creative Industries, Arlington, Virginia, October 18.

Teaching

Guest Lecturer

Digital Transformation (Master Core) Fall 2020-2021

Recitation Instructor

Ph.D. Microeconomics (PhD Core) (by Brian K. Kovak) Fall 2021

Teaching Assistant

Carnegie Mellon University, Pittsburgh, PA

Managing Disruptive Technologies (by Ananya Sen) Spring 2022

Managing Disruption in Media and Entertainment (by Michael D. Smith) Spring 2020-2022

Digital Transformation (by Michael D. Smith) Fall 2019-2021

Statistics for IT Managers (by Daniel Nagin) Fall 2020

Columbia University, New York, NY

Capstone Project Course (core course for Masters of Applied Analytics Program, Masters of Actuarial Sciences Program, mentored master students on capstone projects) Summer 2017

Selected Coursework

Carnegie Mellon University, Pittsburgh, PA

PhD Econometrics I & II

PhD Microeconomics

Intermediate Statistics

PhD Machine Learning

Structural Marketing Models

Tracking Political Sentiments Using Machine Learning

Analytical & Structural Marketing Models

Human Judgment and Decision Making

Columbia University, New York, NY

Algorithms for Data Science

Social Network Analysis

Professional Activities

Program Committee

Conference on Information Systems and Technology, 2021

Referee

Conference on Information Systems and Technology, 2021; International Conference on Information Systems 2020-2021.

Carnegie Mellon University

Dear NBER Research Associates,

I am Helen Shuxuan Zeng, 4th-year PhD student in information system and management at Heinz College, Carnegie Mellon University. I am super excited to apply to attend the Innovation Research Boot Camp organized by NBER in 2022.

The economic analysis of new technologies and innovation is at the heart of many economics and policy studies, with most of them focusing on the benefits arising from innovation. My research has been examining the downsides of technological and innovative changes in underground economy, and therefore, governance in relevant fields. Specifically, my research incorporates economics modelling and machine learning techniques to empirically address an important and timely public policy question: the impact of innovation on underground commercial sex economy and how to respond to the growth in human sex trafficking facilitated by such innovation (e.g., online marketplaces). I am proposing to finish my doctoral dissertation in this research area. In the following, further details will be provided about my past and current research, my plans for future study on this topic, as well as other research projects in process.

My first study in this line of research was motivated by a study which examines a technological and organisational change happening in the commercial sex market with its results suggesting that the digitization evolution of the market (market's moving online) reduced violence against women in terms of female homicides.[1] From the beginning of 2020, I started to work with Prof. Michael Smith[2] and Prof. Brett Danaher[3] on a paper following the aforementioned study, analyzing the impact of an April 2018 law which shut down the online major escort advertising portals and are designed to reduce online human trafficking. The paper was given the Suresh Konda Award for the best first year doctoral student paper at CMU's Heinz College and I was honored to be awarded the K&L Gates Presidential Fellowship in Ethics and Computing by Carnegie Mellon University. In this paper, I compiled local level data from FBI's Uniform Crime Report (UCR), Marinus Analytics (a local star-up in Pittsburgh) and found that in contrast to the prediction of previous studies, the shutdowns did not increase violence against women in terms of female homicides and rape incidents.

[1] Cunningham S, DeAngelo G, Tripp J (2021) Did Craigslist's erotic services reduce female homicide and rapes? Journal of Human Resources. Forthcoming.

[2] J. Erik Jonsson Professor of Information Technology and Marketing at Carnegie Mellon University's H. John Heinz III College, https://mds.heinz.cmu.edu/

[3] The George L. Argyros School of Business and Economics, Chapman University, https://www.chapman.edu/our-faculty/brett-danaher

Last summer, I partnered with IBM's Traffik Analysis Hub and an organization called Stop The Traffik to obtain data compiled from a variety of public, NGO, and government sources documenting online sex trafficking and how the location and frequency of trafficking has changed over time. Our results with regard to the law show that the shutdown had no effect on the number of sex trafficking cases or prostitution activities, likely because the majority of advertisers and users of the shut down sites quickly gravitated toward other remaining (often off-shore) online advertising portals. The volume of escort ads soon recovered on a new group of other websites post the passage of the law. In July 2020, IBM and Stop The Traffik invited me to present our findings and ongoing research during meetings of their worldwide research partners.

My current project in this research area has been analyzing whether recent legislation has made it more difficult to sell minor victims for sex online. To analyze this question, I scraped an extensive data set from an online review site that allowed us to document the reported ages of individuals being advertised for commercial sex online, information about the specific sex services they provided, and the advertised prices for those services. In addition, I obtained a dataset from Heyrick Research documenting the geographic locations of Illicit Massage Businesses in the United States, and how the prevalence and location of these businesses has changed over time. The Illicit Massage Industry has become a hub for sex trafficking of Asian nationals, and I am hoping to analyze the economics of this industry, the impact of technological innovation from other industries that have reshaped this specific market and how recent Federal, state, and local policy changes have impacted the market for foreign sex trafficking victims.

So far my research has had direct policy impact. In the summer 2020, the Senate Judiciary Committee voted on a bill designed to reduce the prevalence of Child Sex Abuse Material online. Senator Bob Casey co-sponsored this bill. My primary advisor Prof. Michael Smith spoke at length to his Legislative Director about our research and sent him a copy of my first paper so he could brief the Senator and the bill's other co-sponsors on our findings.

I am genuinely excited about the opportunity of attending the research boot camp. I am looking forward badly to hearing the presentations from, as well as to interacting with the distinguished researchers & scholars at the camp so as to gain deeper insights of innovation economics and to help each other out in the booming & "innovation" in the research of the attendees. Thank you for considering my application.

Sincerely,

Helen

Carnegie Mellon

Michael D. Smith
J. Erik Jonsson Professor of
Information Technology and Marketing

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Carnegie Mellon University
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January 20, 2022

Dear NBER Innovation Research Boot Camp Selection Committee,

I am pleased to nominate Shuxuan (Helen) Zeng for inclusion in this year's inaugural NBER Innovation Research Boot Camp. I know Helen would benefit personally from participation in this year's event, but more important I think your other participants would benefit from Helen's research and perspective on the economic impact of new market innovations. Specifically, Helen's research addresses issues around economics of innovation, but from a novel perspective: Analyzing the social harms that are sometimes facilitated by new technological innovations, and how public policies can address these harms.

Helen's first paper in this area analyzed the impact of an April 2018 law designed to reduce online human trafficking. Helen showed exceptional independence and creativity in pursuing this research. To conduct this research, Helen obtained a complex dataset of advertisements for commercial sex services posted to online platforms and combined these data with data from the FBI's Uniform Crime Reporting data and unstructured data she scraped from Archive.org on the regional entry of commercial sex advertising platforms. She then executed the difficult and manual process of matching the unstructured location data in the sex services advertisements with the FBI's city-level reporting data and the regional-level entry data from Archive.org so she could run her empirical models. Her independence and skill in pursuing this research was well above what I have seen from doctoral students, and on part with what I would expect from advanced junior faculty.

Some measures of the quality of her work are that her paper was selected by the Heinz College faculty as the winner of the Suresh Konda Award for the best doctoral student paper in our program and was selected for presentation at the 2021 NBER Summer Institute. Her paper, and her broader program of proposed research in this area, also led to Helen receiving CMU's K&L Gates Presidential Fellowship in Ethics and Computing.

Beyond its demonstrated quality, Helen's research has also has broader policy impacts. In July 2020 the Senate Judiciary Committee voted on a bill designed to reduce the prevalence of Child Sex Abuse Material online. Senator Bob Casey (D-PA) co-sponsored this bill and before the vote I spoke at length to the Senator's Legislative Director about Helen's research and sent him a copy of her paper so he could brief the Senator and the bill's other co-sponsors on her findings.

Following this paper, Helen continued to impress me with her drive and creativity in analyzing potential unintended harms from digital innovations. Helen is currently analyzing whether recent legislation has made it more difficult to sell minor victims for sex online. To analyze this question, she scraped an extensive dataset from an online review site that allowed her to document the reported ages of individuals being advertised for commercial sex online, information about the specific sex services they provided, and the advertised prices for those services. While her analysis of these data is preliminary, she found evidence that the April 2018 law caused a disproportionately large increase in advertised prices for providers in younger (18-21, 21-24) age groups, consistent with the hypothesis that the law may have reduced the supply of younger sex providers. She is currently analyzing whether there was also a disproportionate increase in the prices of "riskier" services that might be associated with trafficked victims.

In addition, earlier this week she obtained a dataset from Heyrick Research documenting the geographic locations of Illicit Massage Businesses in the United States, and how the prevalence and location of these businesses has changed over time. The Illicit Massage Industry has become a hub for sex trafficking of Asian nationals, and Helen is hoping to analyze the economics of this industry and how recent Federal, state, and local policy changes have impacted the market for international sex trafficking victims.

Helen also recently partnered with IBM's Traffik Analysis Hub and an organization called Stop The Traffik to obtain data compiled from a variety of public, NGO, and government sources documenting online sex trafficking and how the location and frequency of trafficking has changed over time. IBM and Stop The Traffik were sufficiently impressed with Helen's work that they invited her to present her findings and ongoing research program at a meeting of their worldwide research partners last month.

In short, Helen's work in this area has positioned her to become a leader in the both the academic research and public policy analysis of the potential harms associated with digital innovations, and how public policies can address these harms. As such, I believe she would make an outstanding choice for inclusion in the 2021 Innovation Research Boot Camp—and I believe she is someone whose research perspective will benefit your other conference participants as they conduct research in this important area.

Kindest regards,



Michael D. Smith
J. Erik Jonsson Professor of Information Technology and Marketing