Dear Organisers of the Innovation Research Boot Camp,

I am excited to apply for the Innovation Research Boot Camp, where I see the opportunity to explore the frontier of innovation research and foster collaborative networks within the community.

My own research focuses on the rapidly changing landscape of digital innovations and their optimal integration with human processes. My work concerns several topic areas, including designing optimal human-AI decision-making systems, exploring the impact of labour and technological shocks on AI data annotation, enhancing driver predictions and behaviour through telematics, and the impact of AI job recommendations on college students' labour market decisions. These questions drive my passion for innovation research, and I am eager to contribute to the advancement of knowledge in these domains.

My hope is that my research agenda aligns with the goals of the innovation boot camp, and I am eager to contribute to and benefit from the vibrant academic community it aims to cultivate.

Thank you for considering my application!

Best,
Ruru Hoong
+16176822668
ruruhoong@g.harvard.edu

Recommender:
Jesse Shapiro
jesse.m.shapiro@gmail.com

RURU (JUAN RU) HOONG

ruruhoong@g.harvard.edu, +1 (617) 682-2668
ruruhoong.com

EDUCATION

Harvard University — **Cambridge, MA**
PhD Candidate in Business Economics (joint with Harvard Business School) — *2020 – Present*
- Fourth year candidate with fields in labor/public and behavioral economics
- Completed PhD courses: Micro, Macro, Metrics, Public I and II, Empirical Research in Labour, Psychology & Economics, Experimental Economics, History and Human Capital, Industrial Organisation I, Behavioural Development

Stanford University — **Stanford, CA**
B.A. Economics with Honours and Distinction [GPA: 4.05/4] [GRE: Q: 169, V: 167, W: 5.5] — *2015 –2019*
- Phi Beta Kappa (elected as a junior), Firestone Medal for "The Behavioral Economics of Social Media" (awarded to top 10% of theses university-wide)
- Study abroad: Stanford in Oxford (April – June 2017) and Stanford in Washington (April – June 2018)

St Joseph's Institution International — **Singapore, Singapore**
International Baccalaureate Diploma [45/45] — *2010 –2014*
- Awarded Principal's Award, Economics & Theory of Knowledge Award, SJII Scholarship, Cambridge Top in World for Intl Mathematics

PUBLISHED PAPERS

"Self Control and Smartphone Use: An Experimental Study of Soft Commitment Devices." — *Nov 2021*
European Economic Review, Vol 140

WORK EXPERIENCE

Harvard Department of Economics — **Cambridge, MA**
Teaching Fellow — *2022 – Present*

Harvard University — **Cambridge, MA**
Resident Tutor – Eliot House — *2022 – Present*

Boston Consulting Group — **London, United Kingdom**
Associate — *2019 –2020*
- Associate in London office, summer associate in Boston office June-August 2018, with a focus on technology cases

Stanford Institute for Economic Policy Research — **Stanford, CA**
Research Assistant — *2017 –2019*
- Assisted Professor Muriel Niederle, Professor Matthew Gentzkow, and Professor Paul Oyer in their respective research

World Bank — **Washington, DC**
Intern — *2018*
- Interned with the Mind, Behavior, & Development Unit (eMBeD): using behavioral sciences to fight global poverty and reduce inequality

Stanford Department of Economics — **Stanford, CA**
Teaching Assistant — *2017*
- Taught as a teaching assistant for Economic Analysis I (introductory microeconomics), under Professor Christopher Makler
- Led 3 section classes over two terms (~70 total students), covering consumer/firm behavior, role of markets, and optimization techniques

GIC (Government of Singapore Investment Corporation) — **Singapore, Singapore**
Fixed Income Department Summer Analyst — *2017*
- Conducted detailed analysis of Fed policies and developed a forward-looking indicator for forecasting China CPI
- GIC is Singapore's largest sovereign wealth fund, with well over US$100 billion in assets in over 40 countries worldwide

Ministry of Finance — **Singapore, Singapore**
Social Programmes Research Intern — *2015*
- Presented research on the financial sustainability of long-term care in Singapore to the Social Programs unit
- Attended conferences on behalf of the Ministry, to network with healthcare professionals and gain relevant policy insight

Ministry of Education — **Singapore, Singapore**
School Planning and Placement Division Intern — *2015*
- Researched and compiled best practices on student integration in local schools for the International Students Integration Section
- Organised a conference that brought teachers from around the country together for programming and networking

The world is rapidly changing, and I seek to understand that change. Investigating new digital innovations – their efficient design and use in human collaboration – underlies much of my research.

My main research project (with Bnaya Dreyfuss) explores the optimal integration of AI and human choice. What is best way of providing AI signals as an input to human decision-making? In particular, can we coarsen the signal in a way that will adaptively induce better decision-making, given the human's biases in signal inference? We are developing a model of optimal coarsening that we will test in two contexts: a controlled experiment in the context of loan approvals, and then an in-situ experiment in a healthcare context.

Relatedly, I am exploring collaborations with a Chinese retina-based AI imaging firm that diagnoses eye-related ailments in medical institutions across Asia. Potential research directions include analysing the impact of sensitivity/specificity adjustments on diagnoses and doctor overrides, as well as exploring the effects of the technology on labour (e.g., wage and supply of specialists) and healthcare outcomes in different regions.

Two other projects of mine relate to AI innovation. First, in collaboration with an AI data annotation firm, I aim to explore the labour input into AI innovation (with Shreya Tandon). In particular, we aim to answer: how will the evolution of new technologies impact (i) the marginal product of GPU vs. human labor, (ii) wage structures, and (iii) how best to hire and structure work? Additionally, in a potential collaboration with one of the largest European insurance firms, I explore innovation in auto-insurance. The project is likely to take one of three different directions: (i) designing optimal driving-behaviour-contingent incentive contracts considering consumer biases, such as loss aversion and present bias, (ii) understanding the impact of driver mispredictions on telematics drop-out rates / policy implications for reducing attrition, and (iii) how best to utilise telematics data to predict and intervene on harmful driving behavior.

I also have several other projects relating to new technologies. My undergraduate thesis, *Self control and smartphone use: An experimental study of soft commitment devices* (European Economics Review, 2021) sought to understand addiction in the digital space. I've continued this work in grad school, running an experiment (with Peter Hickman and Yulu Tang) on 13 million active users in collaboration with a large social media platform to document the demand for, and effectiveness of soft commitment devices, in a naturalistic setting orders of magnitude larger than any previous experiment on commitment. I am also studying the causal impacts of smartphone use on youth (with Hunt Allcott and Matthew Gentzkow) in collaboration with a parental control app and the Utah state government. A nascent project (with Julia Gilman and Ethan Matlin) investigates the impact of a provision of an LLM-based job recommendation chatbot on college students' labour market decisions, in particular, whether or not better-targeted recommendations can increase job exploration. Separately, I'm working on a large-scale survey on privacy preferences and valuations of data privacy across the world (with Andrew Kao and David Yang), which could shape data-related regulations and the supply of data, a key input in the data-intensive economy. In parallel, we are also in the process of coding up historical privacy regulations across the world and looking at the impact of their adoption on AI output: preliminary results show that some aspects of privacy regulations (e.g., extraterritoriality) do have a potentially large impact on AI innovation.

These are all questions that I am incredibly interested in continuing to pursue. It would therefore be a joy and an honour to participate in the Innovation Research Boot Camp, not only to learn directly from the leading researchers in this space, but also to meet and develop relationships with other students and faculty interested in questions such as these.

January 24 2024

Jesse M. Shapiro
George Gund Professor of Economics and Business Administration
Department of Economics
Harvard University
Cambridge, MA 02138
jesse_shapiro@fas.harvard.edu

Dear Colleagues:

I am writing to recommend Ruru (Juan Ru) Hoong for the 2024 NBER Innovation Research Boot Camp.

Ruru is a fourth-year PhD student in Business Economics at Harvard. I have been advising Ruru's dissertation closely since the summer of 2022. I feel I am in a good position to evaluate Ruru's potential to contribute to, and benefit from, the boot camp.

I recommend Ruru most highly for the boot camp. I think Ruru is an outstanding candidate and I'm sure Ruru will benefit tremendously from the camp and also make great contributions to it.

Ruru has a track record of creative research in collaboration with industry. In one paper, Ruru and coauthors study the rollout of a self-control feature on a large-scale video-sharing platform. Many aspects of the rollout were explicitly randomized, allowing for study of a range of design features. Among the most interesting findings is a simple one: relatively few customers want the feature. Prior work on related features has tended to work with smaller samples of experimentally recruited participants. This study is deployed at scale with an organic population. I think the findings are extremely interesting and the analysis is of high quality.

In another project, Ruru and another student are studying the optimal design of human-AI communication in situations where the human has the final say over a consequential decision. The project studies how to design the AI's reports to the human, balancing the fact that the human may have private information with the fact that the human may be subject to various biases and cognitive limitations. I think this is an extremely creative project with the potential to have substantial impact on scholarship and practice. Early-stage work is likely to involve fairly controlled lab-like or lab-in-the-field settings, but Ruru has made progress towards partnering on a field deployment as well, again leveraging promising connections with industry.

Ruru has other interests as well, including studying the "tagging economy" that has arisen to provide training data for image recognition and other AI services, and the potential for using AI as a job-search tool. In this and other areas, I have found Ruru to be sophisticated in identifying interesting research directions.

I expect Ruru to benefit from the boot camp on many dimensions, including learning more about the economics of innovation broadly, and more about innovation policy, which is an area where I hope to see Ruru's work grow and develop in the future.

Ruru will, in turn, be a great contributor to the boot camp. Ruru is professional, collegial, and a great communicator. Ruru happily takes feedback and is great at integrating input from multiple sources. I would expect Ruru to be a community-builder among the other students at the boot camp.

I recommend Ruru most highly for this opportunity. Thank you for making this boot camp possible as a service to our profession, and for considering Ruru's application.

Sincerely,



Jesse M. Shapiro