NBER ERBC Cover Letter
March 12, 2021

Dear NBER Entrepreneurship Working Group,

Please find attached my application for this year's Entrepreneurship Research Boot Camp (ERBC). My letter of recommendation will come from Prof. Kyle Myers (kmyers@hbs.edu), an alum of the program, who made me aware of this opportunity!

You can contact me at my email (dyue@hbs.edu) or cell-phone (202-704-6446). I can also be reached at the following address:

20 N Harvard St
Wyss Hall, 202H
Boston, MA 02163

Thank you for considering me for this boot camp!

Best,

Daniel Yue

DANIEL N. YUE
Harvard Business School
Wyss Hall, 202H
dyue@hbs.edu
202-704-6446

Education

Harvard Business School, 2019 to present (*expected graduation in 2024*)
Ph.D. Student in Business Administration
Field: Technology & Operations Management (Innovation)

Harvard College, 2012 to 2016
A.B. in Physics (magna cum laude with highest honors)
Secondary Field: Computer Science

Work Experience

Applied Predictive Technologies (Mastercard), 2016 to 2019
Product Manager

Laboratory for Nanoscale Optics (Lončar Group) at Harvard University, 2014
Research Assistant

Calcium Signals Lab at Johns Hopkins University, 2012-2013
Research Assistant

Research

Random Firm Experiments: Evidence from thousands of A/B tests in hundreds of firms (with Rembrand Koning) – [data analysis in progress]
Working Abstract: *Recent research suggests that differences in firm performance are driven by differences in creativity, the capability of firms to generate more promising ideas than others. In this paper, we evaluate this claim with data on over 50,000 digital experiments from just over 500 firms to measure if some firms consistently test ideas that result in larger average treatment effects. Surprisingly, there are no persistent firm-level differences in the median idea quality across firms. Further, there is relatively weak persistence in the share of good ideas with positive treatment effect, and those with the greatest share of good ideas still test bad ideas almost half of the time. Instead, we find that firms consistently differ in the distribution of the ideas they test —some firms show persistently greater dispersion and tail thickness. Our findings imply that differences in firm performance rest not in differences in the typical quality of an idea, but are more likely rooted in differences in the ability of the firm to generate many ideas and then select the best.*

Graduate Coursework

All coursework is completed except present coursework (Spring 2021), which is *italicized.* All coursework is at Harvard except for two MIT courses (marked below).

Economics

1. Microeconomic Theory I (Maciej Kotowski)
2. Microeconomic Theory II (Chris Avery and Elon Kohlberg)
3. [MIT] Organizational Economics (Bob Gibbons and Charles Angelucci)

Methods

1. Principles of Econometrics (Elie Tamer)
2. Econometric Methods (Isaiah Andrews)
3. Design of Field Research Methods (Robin Ely)
4. *Field Experiments (Shawn Cole)*

Technology Management

1. Empirical Technology & Operations Management (Feng Zhu)
2. [MIT] The Economics of Information and IT (Erik Brynjolfsson)
3. *The Economics of Innovation and Digitization (Shane Greenstein)*

Strategic Management

1. Organizational Theory (Frank Dobbin)
2. Foundations of Strategy (Juan Alcacer)
3. *Advanced Topics in Strategy (Juan Alcacer)*

Essay

My interest in the entrepreneurship originates from two primary sources. The first source is a lifelong fascination which technology and the way that it shapes our lives and society. This interest was the reason that I chose to study Physics and Computer Science in my undergraduate studies, that I might get a better sense of the method behind the magic. The second source is my interest in uncertainty, and more specifically how we as humans manage uncertainty in our lives. In my work at Mastercard, I designed and developed analytics software with a goal of providing causal evidence for managers as an input to decision-making processes. I was (and still am) fascinated by the way that managers engaged with the analytic results, and how the results gave them confidence to move forward with (or hold back on) important decisions.

As I see it, the entrepreneurship is the fusion of these two interests (e.g. the uncertain process of connecting new technologies to relevant applications in the world) toward a goal of value creation and economic growth. The goal of entrepreneurship research, then, is to organize insights about technology and uncertainty into frameworks that can empower both creators and policy makers to more effectively create value and drive growth. This perspective is best captured by Kerr, Nanda, and Rhodes-Kropf 2014, which argues that innovation is driven by the properly structuring the risks of entrepreneurial experimentation in order to enable the smart bets that drive growth.

My current research interests align closely with this experimental perspective, albeit a more granular experiment-level (where one firm has many experiments. In particular, my early Ph.D. research has studied the empirical setting of online A/B Testing through a rich data set (obtained from an A/B testing provider) with experiments from hundreds of firms varying across industry and firm size. A/B Testing is a popular business application of randomized experimentation, where businesses randomly assign website visitors into a "treatment" group or a "control" group so as to obtain a treatment effect for business metrics of interest (such as click-through or realized revenue). For most applications, the control group represents the status quo, and the treatment group represents a new website feature. While the experiment-level analysis doesn't translate neatly into the Entrepreneurial Experimentation framework, my co-author has a working paper empirically establishing the link between A/B testing and positive entrepreneurially outcomes (Koning et al 2020).

For another (currently active) project, the core insight that motivates our research is that each of these A/B Tests can be thought of as an "idea" that the firm is testing, and the treatment effect can be thought of as the "quality" of that idea. In other words, these A/B tests represent draws from an "idea quality" distribution that is measured *prior to* rolling out the ideas. In other words, A/B testing provides a unique window into the firm's innovation process *prior to* selection. In our initial analysis, we came across a puzzling pattern – that for a given firm, there is little persistence in the distribution of these treatment effects from year-to-year. We interpret this as evidence that firm performance is not driven by an ability to *generate and test* higher quality ideas, but rather an ability to *select* the best ideas that are available. More broadly, this style of argument also demonstrates a style of work that I am drawn to – getting deep into the phenomena and using tools and structure as a way of better understanding the people that operate within them.

Regarding my future research interests, I'm very much looking forward to expanding my portfolio of projects as I move into the post-coursework part of my Ph.D. In particular, I'm drawn in two directions. The first direction is a continued interest in the integration of business experimentation, and more generally analytic tools, with strategic decision making. I am particularly drawn to better understanding the organizational frictions that stop organizations from effectively using quantitative, analytic methods to learn from their environment. Some examples of these organizational frictions include the type documented by the recent burgeoning organizational economics literature focused on endogenizing experimentation and knowledge acquisition, demonstrating how moral hazard issues lead to suboptimal organizational learning outcomes (Gieczewski and Kosterina 2019). In particular, I'm planning on doing some field work this summer to observe and collect data on experimentation and organizational factors directly from firms.

The second is an interest in organizational structure and design on the ability for organizations to learn. This interest draws its roots from the classic Sah and Stiglitz 1986 paper on hierarchy and polyarchy, and more recently has manifested in the literature as an interest in an interest in the importance of the economic complexity of its environment (Levinthal 1997, Csaszar and Ostler 2020) in determining of the optimal learning mechanism. Indeed, the Entrepreneurship literature has directly picked up on this theoretical strand, arguing that the precise structure of uncertainty facing entrepreneurs should motivate the methods and structures used to resolve that uncertainty (Gans, Stern, and Wu 2019; Camuffo 2019). I think that this agenda of measuring the economic complexity of an environment and articulating the optimal way for organizations to learn given the complexity is fascinating and one that I hope to devote more time too after completing my coursework.

In summary, I am applying to the ERBC because I believe my interest closely align with the mission of the program, and believe that I can be both a contributor and a beneficiary of the discussions. Thank you for reading and considering me for this year's ERBC!

References:

1. Kerr, William R., Ramana Nanda, and Matthew Rhodes-Kropf. "Entrepreneurship as Experimentation." *Journal of Economic Perspectives* 28, no. 3 (September 2014): 25–48.
2. Koning, Rembrand, Sharique Hasan, and Aaron Chatterji. "Digital Experimentation and Startup Performance: Evidence from A/B Testing." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, September 22, 2020.
3. Gieczewski, German, and Svetlana Kosterina. "Endogenous Experimentation in Organizations." Working Paper, 2019 (R&R at ReStud)
4. Sah, Raaj Kumar, and Joseph E. Stiglitz. "The Architecture of Economic Systems: Hierarchies and Polyarchies." *The American Economic Review* 76, no. 4 (1986): 716–27.
5. Levinthal, Daniel A. "Adaptation on Rugged Landscapes." *Management Science* 43, no. 7 (1997): 934–50.
6. Csaszar, Felipe A., and James Ostler. "A Contingency Theory of Representational Complexity in Organizations." *Organization Science* 31, no. 5 (February 28, 2020): 1198–1219.
7. Gans, Joshua S., Scott Stern, and Jane Wu. "Foundations of Entrepreneurial Strategy." *Strategic Management Journal* 40, no. 5 (2019): 736–56.



HARVARD | BUSINESS | SCHOOL

MARCH 12, 2021

To David Robinson and the organizers of the Entrepreneurship Research Boot Camp (ERBC),

I am very delighted to recommend Daniel Yue, a second-year student here in the HBS Ph.D. program, to participate in the upcoming 14th ERBC. As a prior attendee to ERBC, I have no doubt that Daniel would be a terrific fit in the program.

I have known Daniel since he enrolled in our Ph.D. program and, while my experience as an advisor to Ph.D. students is still brief, Daniel is by far the most inquisitive, intellectually sharp, and creative student I have interacted with so far. Moreover, his prior industry work experience has given him a clear ability to propose research questions that are both academically interesting and clearly practically relevant. He has a strong interest in applied economic theories and quantitative analysis.

As Daniel outlines very nicely in his application, he is especially interested in the intersection of innovation, experimentation, and organizational economics. He has already begun pushing theoretically and empirically on some very promising ideas related to the ways in which organizations formalize the process of experimentation (e.g., via A/B testing protocols). Each discussion I have with him often involves touching on many of the classic theoretical and empirical questions I remember learning about in the ERBC – exploration versus exploitation tradeoffs, managing risky financial portfolios of projects, the measurement challenges of empirically studying the quality of ideas, etc.

Beyond his aforementioned intellectual merits, Daniel is a wonderfully kind person who I always have terrific conversations with. So, I am positive that he will draw great value from being able to interact with the both the faculty presenters and the other students. If I can provide any additional information, please do not hesitate to get in touch with me via email (kmyers@hbs.edu) or phone (301-639-3452).

Sincerely,

Kyle Myers
Assistant Professor of Business Administration
Technology and Operations Management Unit
Harvard Business School