Dear Digital Economics and AI Tutorial Selection Committee,

I am writing to apply for the Digital Economics and AI Tutorial scheduled for September 21, 2023. I am a rising third-year PhD student in Economics at Stanford University, having started my graduate studies in the fall of 2021. My research is primarily focused on firm dynamics, productivity, innovation, and entrepreneurship. I have already met the labor, public, and IO field requirements, and plan to add an emphasis on Corporate Finance. I am primarily advised by Professor Nick Bloom. A highlight of my coursework so far has been taking Erik Brynjolfsson's AI Class, ECON Econ 295/CS 323, The AI Awakening: Implications for the Economy and Society, and winning the prize for the best research or policy proposal.

Participating in the Digitization Tutorial would provide an exciting opportunity to learn more about this growing field from researchers with different backgrounds and gain novel insights on the research that I am currently developing. I am mostly thrilled by the combination of lectures, and interaction inside and outside classrooms with like-minded professors and students in such a concentrated amount of time. I know how valuable this experience can be for engaging with the brilliant community of digitization researchers and their cutting-edge research, and would so be looking forward to participate! For this reason, my application continues with a statement of my current work and potential research agenda going forward.

Sincerely,

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In this statement, I describe my main areas of research, using 4 projects I am working on. I am interested in empirical research, with a focus on firms and human capital development. A structured course on digitization could inform exciting new paths for my current projects and structure my future research. I am most excited about the prospect of interacting with leading researchers and students enthusiastic about digitization, and learning about the research frontier and open questions I can potentially contribute answer in the future.

In "Rationalizing Entrepreneurs' Forecasts" we analyze, benchmark, and run RCTs on a panel of 7,463 U.S. entrepreneurs (with a strong online presence) making incentivized sales forecasts. We assess accuracy using Stripe, a large payment platform provider administrative data. At baseline, only 13% of entrepreneurs forecast their firm's sales in the next 3 months within 10% of the realized value, with 7.3% of the MSE attributable to bias and the remaining attributable to noise. We find that forecasting performance (for both own and hypothetical firm) is a strong predictor of sales, growth, and survival. Increased reward payments significantly reduce bias, while data usage significantly reduces noise and MSEs. Despite the theoretical consensus of the importance of accurate forecasts, managerial overconfidence is sometimes associated with increased firm innovation (Galasso and Simcoe, 2011; Hirshleifer et al., 2012), and corporate investment (Ben-David et al., 2013). The next step in the research agenda would be to analyze the extent misperceived expectations (and their heterogeneity) affect investment choices and resulting innovation.

In "How do AI private sector innovations affect the direction of academic research and career choice?", J. Bonney (another Stanford grad student) and I explore the evolving dynamics of research and development in the field of artificial intelligence (AI). We recognize that despite groundbreaking academic research in the early 2000s and 2010s, the rising cost of developing and training large language models (LLMs) has shifted significant advantage to the private sector, which boasts superior computational resources, a concentration of top human capital, and access to quality real-time human feedback. By analyzing data from ArXiv, we observe a notable pivot in academic research focus towards describing models rather than large-scale production. Simultaneously, industry-affiliated researchers seem to be producing less publicly available research, while maintaining their focus on key areas. The project aims to document: a) real-time and historic affiliations of researchers and their respective research directions using LLMs/text analysis, as well as the `intensity` of resources used, b) the impact of significant events and developments on academic output, with examples including the release of ChatGPT and the publication of the Transformers paper, in the context of Computer Science research, c) he use of shocks (IVs/discontinuities in private funding, as well as local labor market shifts/Bartik shocks) as a means to establish the interdependence between industry and academia, given the volatile nature of private sector hiring compared to the academic market.

In "The Effects of Business Loans and Technology Support on the Growth of U.S. Online Start-ups" we will focus on examining the growth determinants of U.S. online start-ups, a growing contributor to overall innovation activity and growth (Klenow, 2022). With the help of two large U.S. technology companies we randomize access to loans, cloud computing credits, and technology information. We will check the performance of these companies on a wide variety of metrics (sales, growth, input choices, R&D investment, etc.), treatment effects heterogeneity, and possible channels through which the effect may take place using both administrative data, webscraping, and surveying.

In "Directed Technical Change: The Case of Work from Home Patents during Covid-19 and Beyond" we examine the text of U.S. patent applications to assess the effects of a large, sudden, surprise shift in work arrangements. We are motivated by a logic similar to Acemoglu (1998) which stresses a higher proportion of skilled workers incentivizes development of skill-complementary technologies. We find that the share of new WFH patent applications is up around 50% in the first year after February 2020, 75% in the second year, and more than double in the last 3 months of 2022. We are currently assessing the effects on WFH pre-pandemic patent holders, use microdata to understand the behavior of investment/R&D decisions, and examine the possible negative effects on other technologies that were not developed due to redirected resources (human capital, financial capital, etc.).

Other research ideas for my dissertation include measuring the effects of big multinational companies (e.g., big tech FAANG) on entrepreneurship and innovation in the short and long-run. On one hand, they can provide increased human capital accumulation to their employees (Haltiwanger et al., 2018). On the other hand, they hire some of the best graduates, including individuals with entrepreneurial qualities, and (re-)direct their efforts away from potentially disruptive innovation projects. We plan to use matched employer-employee administrative data from Norway and office and job openings at the sub-industry and detailed geographical level to inform a structural model and quantify the relative importance of these channels. I am also interested (at both a theoretical and empirical level) in the benefits of proximity in the digital age. More particularly, in my second year paper, "Industry-Academia Ties & the Direction of Innovation: Evidence from Stanford Research Park", we leverage the unique setting of Stanford Research Park (SRP) to investigate the reciprocal effects between industry and academia on innovation. The SRP, established as the world's first science-based industrial park in 1951, and once named the "epicenter of Silicon Valley" provides us with a rich, historical context to probe these dynamics. We try to answer the research question "How does strengthening the relationship between industry and academia affects the quantity and direction of innovation", focusing on outcomes at both firms, individual inventors and professors' level.