Nikhil Kalathil

My research focuses on further understanding geographic heterogeneity in industrial activity, especially in the manufacturing sector at the sub-national level. I am particularly interested in how regional differences in the capability and composition of local manufacturing ecosystems might differentially impact the types of technologies that regions specialize in, the performance of firms in these regions, and regional responses to both positive and negative shocks and disruptions. My current research (with Lauren Lanahan, Maryann Feldman, and Erica Fuchs) focuses on decomposing agglomeration into two components that differentiate between horizontal (peer) and vertical (supplier) effects. We create two new measures of agglomeration at the 6-digit NAICS and county level, detailing the degree to which establishments in a focal industry are concentrated together, or with other industries producing similar outputs (horizontal agglomeration), as well as the degree to which establishments in a focal industry are supplied by surrounding industries (vertical agglomeration). We find that more R&D intensive industries appear to have relatively higher rates of horizontal agglomeration, while industries with a higher share of manufactured inputs have relatively higher rates of vertical agglomeration.

Building on this foundation, I am now exploring (with Lauren Lanahan) how different types of agglomeration economies differentially impact the performance of manufacturing ventures. While a substantial literature documents the importance of agglomeration economies for firm performance, less is known about how different varieties of agglomeration generate heterogeneous returns, especially for new ventures. Alcacer, Deszo, and Zhao (2015) and Alcacer & Chung (2014) describe the available benefits from Marshallian externalities as available "factor pools" and demonstrate how the "appropriability" of factor pool varies by firm size, as well as industry. We build on this work to explicitly test how new manufacturing ventures differentially benefit from specific types of agglomeration effects, and contrast venture performance in relatively peer agglomerated counties from venture performance in relatively supplier agglomerated counties. Our empirical strategy leverages novel measures decomposing county-level agglomeration into horizontal (peer) and vertical (supplier) components. Using these measures, we identify "twin" cases. For each industry-county pair with high peer agglomeration, we identify corresponding industry-county pairs with similar total agglomeration but high supplier agglomeration. This paired design helps address endogenous location selection, as firms likely choose locations based on observable total agglomeration rather than its precise composition – information that was not previously available. We operationalize this design using the National Establishment Time Series (NETS) database, which provides annual establishment-level data on location, employment, sales, and ownership structure for the complete universe of U.S. business establishments. By sampling ventures founded between 2013-2015 in these "twin" settings, we can exploit the quasi-random variation in whether a venture experiences predominantly peer or supplier agglomeration while holding constant industry effects, venture age, and total agglomeration intensity.

As an early career researcher with a training in Engineering and Public Policy from Carnegie Mellon University, I am particularly interested in attending the NBER Entrepreneurship Boot Camp to boost the economic rigor of my research, and to be able to better defend and support my research for an economics audience. The bootcamp's focus on rigorous causal identification strategies would help strengthen my research design, which leverages novel decompositions of agglomeration economies to study venture performance. I am especially eager for an opportunity to discuss my research with the specific set of scholars that will be attending both the NBER Entrepreneurship as well as Innovation boot camps, and look forward to specific feedback from Scott Stern, Jorge Guzman, Josh Lerner, and Heidi Williams.

Alcácer, J., & Chung, W. (2014). Location strategies for agglomeration economies. *Strategic Management Journal*, 35(12), 1749–1761.
Alcácer, J., Dezső, C., & Zhao, M. (2015). Location choices under strategic interactions. *Strategic Management Journal*, 36(2), 197–215.
Kalathil, N., Lanahan, L., Feldman, M., Fuchs, E.R.H. (2025). Varieties of Agglomeration: Disentangling Features of Horizontal and Vertical Agglomeration within the Manufacturing Sector in the United States. *CMU Working Paper*

Carnegie Mellon

Erica R.H. Fuchs
Professor
Department of Engineering
and Public Policy
Carnegie Mellon University
Pittsburgh, Pennsylvania 15213-3890
Telephone: 412 268-1877
Fax: 412-268-3757

February 15, 2025

Dear NBER Entrepreneurship Boot Camp Committee,

I am writing to provide my warm recommendation for Nikhil Kalthil to participate in the NBER Entrepreneurship Boot Camp.

Nikhil's passion surrounds entrepreneurship, place-based economics and industrial policy, His three-paper thesis focuses on industrial mobilization (committee: myself, Maryanne Feldman, Lauren Lanahan, Granger Morgan, and Phil Singerman) which covers timely awareness of firm capabilities and entry during crises, short-term economic dynamism (e.g. firm entry) as a response to supply shortages, and a novel characterization of regional ecosystems. However, Nikhil and Nikhil's interests are so much broader -- from his own personal entrepreneurship starting a policy consulting company, to his substantial people-skills and influence of policy-makers.

Nikhil completed his Ph.D. in the Department of Engineering and Public Policy (EPP) in May 2024 at Carnegie Mellon University (CMU), and currently works as a Research Scientist and Deputy Director of the Critical Technology Initiative @ CMU. Nikhil came to CMU with a double-major in Math and Economics from Oberlin College, and experience working in both academic research (with Kathryn Shaw at Stanford) and five years at a non-profit research institute on real-world technology policy problems (at the Stanford Research Institute - SRI). One of the reasons Nikhil returned for his masters in Civil Engineering (focused on transportation policy issues) and subsequently for his Ph.D., was that during his work at SRI, he became convinced he needed a deeper understanding of the technology he was studying (at the time semiconductors) and better machine learning and natural language processing analytic tools to make meaningful progress in solving some of the world's most important technology policy challenges.

Nikhil arrived at EPP and CMU in the middle of COVID-19 global pandemic, and hit the ground running in terms of novel contributions. He within weeks identified that with public data -- here through Thomasnet, the largest business-to-business directory of North American Manufactures -- he could rapidly gain a real-time situational understanding of how companies were emerging to fulfill unserved demand for final products and intermediate inputs required for critical medical supplies. His work showed that government data being used to drive pandemic supply chain

decisions was likely orders of magnitude off, due to missing the contributions of small and medium sized firms. Within only a few months of Nikhil's starting, I led my own broader June 9, 2021 testimony before the Ways and Means Committee subcommittee on Trade with Nikhil's data, and then Nikhil led our full team's September 2020 testimony before the International Trade Commission specifically on the data and analytics thereof. We published the work in *Issues in Science and Technology* in December 2020, just six months into Nikhil's Ph.D. program. In May 2021 we held a Chatham House Rule workshop on Lessons from COVID for data infrastructure and manufacturing supply chains with very high level leaders from government, industry, and academic. Nikhil was the final speaker in the first session on data, and blew the other three presentations from very high level speakers out of the water by demonstrating the limitations of any one data source or sampling technique, and the benefits that could be accrued by merging sourcing of public government), publicly available online, and private (firm) data.

Nikhil built upon his data science work providing timely situational awareness of firm entry during COVID to write a multi-method paper on the short-term economic dynamism (here, firm entry) as a policy tool to address supply shortages during crises (published in *Industrial and Corporate Change*). As written in the abstract, "We find that while large manufacturers could rapidly scale up, onshore, or diversify production to enter into domestic production of critical medical supplies, these large manufacturers alone were insufficient to meet the spike in demand. In face of this shortage, small and medium enterprises (SME), who entered into mask and respirator production as de novo firms, spin-offs, and by diversifying, were important in increasing overall domestic capacity and serving markets unmet by large hospital distributors. These firms often had fewer competencies and resources compared to larger firms, and received less effective government support. Despite these disadvantages, a number of SMEs succeeded in entering into domestic production, and our interviews suggest this capacity could have been better integrated into the national response. We propose new theory for how and when federal and state governments should support short-term economic dynamism (firm entry into target products and/or markets) during crises to address supply shortages, and the types of market and network failures federal or state governments may be most effective at addressing." Nikhil combined this work with another of my Ph.D. student's work from his cohort to write a paper that subsequently won the Babbage Industrial Innovation Policy Award from the University of Cambridge.

Intrigued by the state-level differences in his second paper, for his third paper in his dissertation, Nikhil wanted to dig into why entry by small and medium sized manufacturing firms during the pandemic in response to shortages differed so dramatically by state. He independently enlisted the help of Maryanne Feldman and Lauren Lanahan. The third paper which emerged, "Varieties of Agglomeration: Disentangling Features of Horizontal and Vertical Agglomeration within the Manufacturing Sector in the United States," has a very positive revise and resubmit from *Research Policy*. Per the abstract, the paper "decomposes regional agglomerations into multiple variables that differentiate between horizontal (co-location with the own/peer industries) and vertical (co-location with suppliers) agglomeration. Using employment and establishment data at the US county level and the six-digit industry level, we demonstrate that manufacturing

industries and regions vary in their degree of vertical and horizontal agglomeration. Industries with a higher contribution of manufactured goods to overall inputs' value are correlated with vertical agglomeration while more R&D intensive industries are correlated with horizontal agglomeration. Using the semiconductor industry as an illustrative example, we document how heterogeneity in industry-county rates of vertical and horizontal agglomeration might reflect differences in the products that firms operating in different counties manufacture. These industry-level and within-industry differences are under-observed and sometimes obfuscated by existing agglomeration measures. We conclude with a theoretical framework for regional and industrial policy interventions."

As a someone who had spent seven years in the "real world" after completing his undergraduate degree and before coming back for his Ph.D., Nikhil was not interested in a long Ph.D. program focused exclusively on an academic career track. While still in the Ph.D., he had already started a policy consulting company with Afonso Amaral (another of my Ph.D. students from his cohort) building on their research. I was also simultaneously launching the Critical Technology Initiative at CMU across five colleges. Nikhil is very independent, strong operationally, and a terrific networker, so I offered for him to become a Research Scientist and the Deputy Director of Strategic Initiatives for the Critical Technology Initiative. This role enabled him to continue working on publishing papers, continue his policy consulting, and explore applied work related to both, such as his current effort to do a war game together with Lux Capital on local economic development in Western PA involving senior science and industrial policy leaders in our state government. At the same time Nikhil has started multiple new papers and collaborations, including a paper with Lauren Lanahan relating his novel measure of agglomeration to firm outcomes, a paper on the economics of semiconductor supply chains, and a paper on food systems.

In summary, Nikhil Kalathil is not your typical applicant to the NBER Entrepreneurship Boot Camp in so much as his interests are diverse, including both applied as well as academic. I don't see Nikhil becoming a Tier I academic -- but he is definitely entrepreneurial, collaborative, connected with practitioners, and knows how to pair with top academics to do Tier I work.

Sincerely,



Erica R.H. Fuchs