Application for the NBER Digital Economics and AI Tutorial 2027

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Graduate Study

I am Sungjin Kim, a 4th year PhD candidate at Northwestern University, Kellogg School of Management. I entered the PhD program in Fall 2023 and am currently in my fourth year of study. My primary fields of interest are health economics, the economics of innovation, and industrial organization. In addition to completing the first-year core sequences in microeconomics, econometrics, and optimization, I have completed field coursework in health economics, industrial organization, economics of organizations, and labor economics. Building on this training, since my third year I have increasingly focused my research on how market structure, organizational arrangements, and new technologies shape firms' incentives to create, adopt, and diffuse knowledge. I study these questions primarily in the contexts of pharmaceutical R&D and technological innovation, using data on drug discovery, patents, interfirm transactions, and downstream innovation outcomes.

Research Interests and Current Projects

My research agenda centers on the economics of innovation and technology adoption, with a particular interest in settings where digital technologies change the process by which firms search for ideas, allocate attention, and organize production. A recurring question across my work is whether new technologies broaden experimentation and diffuse knowledge, or instead concentrate activity around incumbent capabilities, data-rich domains, and privately controlled assets. I pursue these questions primarily in pharmaceutical R&D and healthcare, where the innovation process is unusually measurable and where changes in search, prediction, and information can have large downstream welfare consequences.

1. AI and the direction of pharmaceutical innovation. My dissertation project studies how adoption of artificial intelligence changes both the direction and productivity of drug discovery. The project combines data on more than 100,000 drug-development projects and their clinical trial designs from 1989-2026 with measures of project-level AI adoption constructed from trial information, contracts, hiring, and patent use. The motivating idea is that much of AI in drug discovery operates as a search, scoring, and prioritization technology: it can lower the cost of evaluating candidate molecules and targets, but its performance is strongest in domains with rich, structured, reusable data. This creates a potential tradeoff between depth and breadth in innovation. I ask whether AI improves downstream R&D productivity while reallocating discovery toward more familiar or crowded scientific areas, showing how a general-purpose prediction technology changes the allocation of inventive effort, not only the level of innovation.

2. Generative AI, worker productivity, and targeting in elder care. My second project studies the rollout of Generative AI CareCall system in South Korea, where conversational AI performs routine welfare-check calls with older adults, flags potential health or welfare concerns, and passes risk signals to human social workers to help make consequential interventions. In collaboration with NAVER, Korea's leading technology firm, I analyze conversation-level data between AI agents and older adults to study AI as a production technology that can substitute for routine monitoring while complementing workers in allocating attention and making decisions. Exploiting staggered municipal adoption, model upgrades, and shocks to social-worker capacity, I plan to estimate how AI affects monitoring capacity, the allocation of scarce human time, follow-up behavior, and downstream health and long-term-care outcomes.

3. Markets for ideas, control rights, and knowledge diffusion. My third project (with Ruofei Guo) studies how institutions governing intangible assets determine whether knowledge diffuses. Because control rights over inventions are often consolidated through acquisitions, licensing, and alliances, private incentives may diverge from what maximizes social value. Acquisitions can foster diffusion by enabling integration and complementary investment, but they may also suppress diffusion when the acquired technology overlaps with the acquirer's portfolio and raises cannibalization risk. To test these mechanisms, I model acquisition as competition for control rights and treat post-acquisition suppression as a latent choice shaped by a cannibalization-versus-profit tradeoff, using patent-citation patterns to infer support versus suppression. The project highlights a central policy trade-off: interventions that promote ex post knowledge diffusion may also reduce acquisition proceeds and weaken ex ante incentives to develop new technologies.

4. Dynamic Gains from the Market for Technology: Evidence from Pharmaceutical Licensing. In my work with Shengmao Cao (Northwestern), Anran Li (University of Minnesota), and Jingyuan Wang (University of Michigan), we estimate the dynamic impact of pharmaceutical licensing on firm-level innovation. Using a matched difference-in-differences design, we show that initial licensing deals lead to a significant increase in future project originations for licensors and licensees, respectively, relative to controls with identical pre-treatment trajectories. These productivity gains are broad-based across therapeutic markets and particularly pronounced for mid-development deals. Our results suggest that licensing and in-house R&D are complements, highlighting a novel channel through which the "market for technology" acts as a catalyst for innovation and growth.

Dissertation Committee

- **Chair** – David Dranove (Kellogg School of Management, Northwestern University)
- **Co chair** – Ben Jones (Kellogg School of Management, Northwestern University)
- Vivek Bhattacharya (Department of Economics, Northwestern University)
- Ryan Hill (Kellogg School of Management, Northwestern University)
- Shengmao Cao (Kellogg School of Management, Northwestern University)

Why I want to attend the Digital Economics and AI Tutorial

The tutorial is an ideal fit for my research trajectory because it provides an opportunity to engage with frontier research in digital economics and AI. AI has become a central empirical object in my work, but the questions I want to answer are broader digital-economics questions about adoption, data as an input, search and recommendation technologies, task reallocation, firm organization, and the diffusion of intangible knowledge. I would value the opportunity to learn from researchers working at the frontier of digital economics and AI, and to receive feedback on how to connect industry-specific empirical settings to general economic mechanisms. In particular, I aim to sharpen how I model the tradeoff between improved prediction and narrower search, how I measure productivity when AI changes the set of options firms consider, and how I distinguish automation from human-AI complementarity. The tutorial and the accompanying NBER Digital Economics and AI meetings would therefore be directly relevant to both my current projects and the broader research agenda I hope to develop.