Application for NBER Digital Economics and AI Tutorial

Yajie Xu
Email: yajie@usf.edu
University of South Florida

Graduate Study Overview

I am a fifth-year Ph.D. student in Economics at the University of South Florida (expected graduation 2027), specializing in econometrics, digital economics, computational social science, and AI-assisted decision-making. My coursework includes Bayesian analysis, advanced econometrics, social network analysis, behavioral and experimental economics, and game theory.

In parallel, I am completing an M.S. in Artificial Intelligence (2025–2027), with graduate training in data structures, algorithms, mathematical foundations of machine learning, artificial intelligence, and object-oriented programming. I also hold an MITx MicroMasters in Statistics and Data Science, which strengthened my foundations in machine learning, probability, and statistical modeling.

This interdisciplinary training in economics, machine learning, and computational methods informs my research at the intersection of digital platforms, innovation, and human–AI collaboration.

Research Interests

My research interests center on digital economics, AI-augmented decision-making, innovation networks, and human–AI interaction. I am particularly interested in:

- how generative AI changes learning, creativity, and user behavior;
- how digital platforms shape decision-making through incentives and design;
- how networks mediate spillovers in innovation and collaboration;
- structural and experimental methods for understanding AI-mediated interactions.

Across my projects, I combine economic modeling, Bayesian inference, machine learning, and behavioral experimentation to study how digital technologies reshape economic behavior.

Research Projects

1. AI for K–12 Education and Creativity (Human–AI Interaction)

Role: Research Lead **Aug 2025–Present**

I am designing an AI-powered learning platform that supports K–12 students' creative storytelling and collaboration. The system integrates multiple large language models (LLMs) for real-time feedback and ideation, implemented using React, Node.js, and DigitalOcean-hosted models. I plan to conduct formative evaluations and experimental studies (A/B tests and field RCTs) to measure how AI shapes idea generation, cooperation, and learning pathways. Analytical methods include NLP-based text analysis, ANOVA, and mixed-effects modeling.

This project connects digital learning, human–AI interaction, and the economics of creativity by studying how generative AI influences behavior and skill formation.

2. Bayesian Estimation for Social Network Data (Innovation & Networks)

Role: Research Lead **Oct 2022–Present**

I design a Bayesian structural model to estimate endogenous network effects in R&D collaboration networks, focusing on how firms with immigrant executives differ from native-led firms in forming collaborations and generating innovation. The method improves computational efficiency by 70% relative to existing SAR estimators and enables scalable posterior inference on heterogeneous spillovers. I also coordinate a distributed team collecting 245k+ firm-level observations and construct pipelines for high-dimensional network data on alliances and executives.

Through simulations and posterior analysis, the project examines how executive backgrounds shape network formation, how collaboration structures influence innovation outcomes, and how immigrant-led firms contribute to the diffusion of new technologies. This work informs digital economics by highlighting network spillovers, complementarities, and the role of diverse leadership in innovation.

3. AI-Powered Skin Cancer Detection Platform (ML & Digital Health)

Role: Technical Lead (HackUSF 2025 Winner)

I co-developed an AI-driven diagnostic tool using XGBoost with image embeddings for real-time lesion classification (99% accuracy). The system includes webcam integration, patient data management, and an interactive interface. This project strengthened my experience in machine learning and applying AI to real-world problems.

Dissertation Overview

Tentative Title: *Networks, Innovation, and Human–AI Interaction: Essays on Digital Behavior and Technological Change*

Committee: Prof. Barbos (Game Theory and Behavioral Economics), Prof. Munkin (Bayesian Econometrics), Prof. Baten (Social Networks & AI), Additional members forthcoming.

Planned chapters include:

- Bayesian estimation of endogenous network effects (completed working paper).

- AI-augmented behavior and digital learning environments (in progress).
- Human–AI collaborative decision models (future chapter).

Statement of Purpose

The NBER tutorial aligns directly with my research direction at the intersection of digital economics, AI, and user behavior. I hope to learn from leading scholars on digital platforms, algorithmic design, and human–AI interactions while sharing insights from my own work on innovation networks and AI-augmented learning. This event would provide invaluable guidance for shaping my dissertation and for connecting economic modeling with emerging AI technologies.