Application: NBER Digital Economics & AI Tutorial

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Contact Information

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Graduate Study

I am currently enrolled in my third year of the Business PhD program with a concentration in Information Systems at George Mason University in Fairfax, Virginia, having started in Fall 2023 (expected graduation: Spring 2027). My training combines econometrics, microeconomics, and digital/health information systems, with an emphasis on causal inference using large-scale administrative and clinical data.

In my previous semesters of study, I have completed the following coursework:

- Introduction to Research in Business
- Academic Writing for PhD Students
- College Teaching
- Seminar in Information Systems
- Seminar in Operations and Supply Chain Management
- Seminar in Tech Research in Info Systems
- Special Topics in Information Systems
- Quantitative Methods IV: Multivariate Techniques in Psychology
- Microeconomic Theory 1
- Econometrics I
- Best Methods Course Ever (Econometrics II)
- Seminar in Economics of Info Systems
- Data Mining in Health Care

- AI in Health

This degree combines information systems, artificial intelligence, health informatics, and econometrics to identify causal relationships that might be overlooked in today's health information and health administration fields. I examine how digital technologies (EHRs/EMRs and clinical LLM decision support) alter economic activity in healthcare by modifying search, tracking, coordination, and verification costs, and how these changes impact quality, time, and financials. By focusing on the artifacts of information systems in healthcare, I aim to help bridge the gaps between marginalized populations and health policy.

In my previous work experience, I managed an electronic medical records company that was heavily focused on the next software release and future deliveries, which distracted us from recognizing the real reasons behind surprising clinical behaviors. Even when we tried to identify causal effects, it became clear that I lacked the ability to do so accurately. This realization led me to shift my focus to this degree and to helping the broader community. Gaining the skills and experience to pursue this goal is what makes this opportunity so appealing.

Research Interests / Projects

George Mason University offers the option to publish three journal articles as a dissertation, which is the path I am currently following. My personal background is in perioperative medicine, specifically in anesthesia care and operations. Using that perspective, I am leveraging a large dataset provided by my previous employer for research purposes. This dataset is currently utilized in all three papers in some capacity, as it encompasses over 27 million unique surgical encounters, including demographic, procedural, provider, and facility information. The three papers, at various stages from review to core development, are as follows.

1. **Assessing the Cost and Quality Implications of Clinical Care Teams for Anesthesia Administration**
   This first paper examines how different clinical care team compositions influence quality outcomes, billed clinical time, total patient charges, and gross payments on those charges. It is currently under review at *Anesthesiology* (`https://journals.lww.com/anesthesiology`). The findings are surprising and contrast with current literature, which enhances our understanding of how these teams impact the overall healthcare

system. Ultimately, these findings may influence how health systems support care teams after understanding the negative impact on patients when care teams are utilized.

2. **Minimizing Coordination Costs, Maximizing Care: Clinical Teams under EMRs through the Lens of Transaction Cost Economics**
   The second project builds on this original idea by shifting the focus to the technology artifact as the independent variable. Using EHR systems from Epic, Cerner, and what are known as best-of-breed systems, this research examines how these platforms can influence the same dependent variables: quality, time, charges, and payments. The goal of these first two papers is to develop an empirical framework that provides a solid foundation for the third paper, which uses this data while including LLMs in a HIPAA-protected manner.

3. **Managing the Bias: How a Novel Architecture Using EHR Data Can Mitigate the Sex and Racial Biases in Medical LLMs**
   My third project designs a clinical LLM architecture that integrates large-scale EHR clinical data extracted from Epic, Cerner, and other vendors, combining it with the financial and other administrative data associated with the professional billing operations. Conceived initially as a decision support tool for clinicians at point-of-care, the project now explicitly targets fairness and is motivated by recent reporting on systematic performance gaps in medical LLMs for women and minority patients (Heikkilä, 2025). This novel architecture will test whether augmenting training with representative EHR corpora narrows these gaps while maintaining accuracy, calibration, and safety at the bedside.

Dissertation Plan and Committee

At this time, I have not yet formed the entire committee for my dissertation, as I only recently passed the comprehensive (qualifying) exams in June 2025. The committee will be chaired, however, by my advisor, Dr. Brad Greenwood (`https://www.fixedeffects.com`).

References

Heikkilä, M. (2025, September 19). *AI medical tools downplay symptoms in women and ethnic minorities.* @FinancialTimes; Financial Times. `https://www.ft.com/content/128ee880-acdb-42fb-8bc0-ea9b71ca11a8`