

Kuofu Liu

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EDUCATION

University of Michigan, Ann Arbor <i>Doctor of Philosophy in Industrial and Operations Engineering (IOE)</i>	Ann Arbor, MI 08/2024-05/2029 (Expected)
<ul style="list-style-type: none">◦ Advisor: Prof. Mariel Lavieri◦ GPA: 3.83/4.0◦ Core courses: Dynamic Programming (A), Stochastic Process I (A), Stochastic Optimization (A)	
University of Southern California <i>Bachelor of Science in Industrial and Systems Engineering (ISE), Specialization in Applied Analytics</i>	Los Angeles, CA 09/2022-05/2024
<ul style="list-style-type: none">◦ GPA: 3.81/4.0; Major GPA: 3.87/4.0◦ Research Assistant at Covid-19 Data Source under Viterbi School of Engineering (09/2022-05/2024)◦ Core courses: Applications of Machine Learning (A), Operations Research: Deterministic Model (A), Operations Research: Stochastic Model (A), Supply Chain Design (A)	
Sichuan University - Pittsburgh Institute <i>Bachelor of Engineering in Industrial Engineering (IE)</i>	Chengdu, China 09/2020-06/2022
<ul style="list-style-type: none">◦ GPA: 3.88/4.0◦ Teaching Assistant for Analytical Geometry & Calculus III (01/2022-06/2022)◦ Core courses: Information Systems Engineering (A), Differential Equations (A), Human Factors (A), Statistical Testing & Regression (A), Matrices & Linear Algebra (A), Productivity Analysis (A)	

RESEARCH EXPERIENCE

Discharge Decision-making in Cardiac Rehabilitation (CR) System with Heterogeneous Patient Adherence Pattern <i>Supervised by Prof. Mariel Lavieri</i>	<i>Ann Arbor, MI</i> 04/2025-Present
<ul style="list-style-type: none">◦ Collaborated with Michigan Medicine clinicians to understand current clinical workflows, discharge practices, and patient flow constraints in CR settings.◦ Conducted literature review on cardiac rehabilitation operations, adherence prediction, and patient flow optimization problems to understand problem challenges and research gaps.◦ Defined key research objectives, including modeling patient adherence, predicting dropouts, and optimizing discharge timing to optimize patient admission and discharge decisions in CR centers under uncertainty.	
Center-Level Variation in the Use of HCV+ Livers: Implications for Waitlist and Post-Transplant Outcomes <i>Supervised by Prof. Mariel Lavieri</i>	<i>Ann Arbor, MI</i> 08/2024-Present
<ul style="list-style-type: none">◦ Investigated the impact of listing for hepatitis C virus-positive (HCV+) liver organs on transplant access and outcomes using Kaplan-Meier survival curves, Cox proportional hazard models, and Fine-Gray competing risks models based on national UNOS registry data from 2015–2023.◦ Identified demographic and clinical differences between candidates listed for HCV+ vs. HCV– organs (e.g., liver disease etiology, insurance status, and ethnicity).◦ Analyzed center-level variability in HCV+ organ use and HCV+ organ listing, accounting for transplant volume and deceased cardiac donor (DCD) utilization rates.	
Synchronizing the Treatment of Multiple Chronic Conditions Based on Maximum Safe Treatment Intervals <i>Supervised by Prof. Mariel Lavieri</i>	<i>Ann Arbor, MI</i> 08/2024-Present
<ul style="list-style-type: none">◦ Conducted a literature review on the synchronization of treatment scheduling, treat-and-extend policy, and maximum safe treatment interval (MSTI) for chronic conditions.	

- Conducted 10-year simulations under three treatment policies (π_1, π_2, π_I) to quantify overtreatment risk relative to clinic visit reductions in chronic conditions treatment.
- Defined and implemented the Extra Injections per Saved Visit (EISV) index to identify MSTI patterns where synchronization policies yield minimal overtreatment and maximal visit reductions.
- Provided clinical decision-making suggestions based on simulated policy performance across 45 MSTI combinations.

Parameter Estimation and Sensitivity Analysis of SEIRD Compartment Model

Los Angeles, CA

Based on Covid-19 Data in the U.S.

12/2022-05/2024

Supervised by *Prof. Randolph Hall*

- Established an extended SEIRD compartment model with time-varying transmission rate and fatality rate for 50 U.S. states using COVID-19 case and death data, with the model reaching the average relative root mean square errors (RRMSEs) of 1.54% for cases and 1.20% for deaths.
- Implemented a Monte Carlo simulation based sensitivity analysis spanning 245 days to explore robustness of the SEIRD model with eight parameters following uniform, normal, lognormal, gamma, and truncated normal distribution.
- Performed a U.S. nation-level sensitivity analysis for the SEIRD model with 410 parameters, accounting for the impact of state-to-state transportation on COVID-19 transmission.
- Estimated daily state-to-state travel from March 15th, 2020 to September 15th, 2020 using the gravity model with adjusted power parameters based on daily transportation data from the Bureau of Transportation Statistics (BTS).
- Established the SEIRD model for 50 U.S. states using COVID-19 data incorporating transportation effects to assess the time-varying disease interaction between states to advise travel policy-making during a pandemic.

PUBLICATIONS & PRESENTATIONS

Journal Articles

1. Mingdong Lyu, Chang Chang, **Kuofu Liu**, and Randolph W. Hall, “Dynamic Vaccine Allocation for Control of Human-Transmissible Disease,” *Vaccines*, vol. 12, no. 9, p. 1034, 2024. doi:[10.3390/vaccines12091034](https://doi.org/10.3390/vaccines12091034) ↗.
2. Mingdong Lyu, **Kuofu Liu**, and Randolph W. Hall, “Spatial Interaction Analysis of Infectious Disease Import and Export between Regions,” *International Journal of Environmental Research and Public Health*, vol. 21, no. 5, p. 643, 2024. doi:[10.3390/ijerph21050643](https://doi.org/10.3390/ijerph21050643) ↗.

Working papers/In preparation

1. Luke DeRoos, **Kuofu Liu**, Amirehossein Moosavi, Mariel Lavieri, Joshua Stein, and Jason Miller, “Synchronizing the Treatment of Multiple Chronic Conditions Based on Maximum Safe Treatment Intervals,” *In Preparation*, 2025.
2. Thomas Hunold, **Kuofu Liu**, Yili Wang, Amirehossei Moosavi, David Hutton, Mariel Lavieri, and Neehar Parikh, “Listing for Hepatitis C Positive Organs is Associated with Increased Rate of Transplant and Decreased Death on the Waitlist” *In Preparation*, 2025.

Conferences

1. Luke DeRoos, **Kuofu Liu**, Amirehossein Moosavi, Mariel Lavieri, Joshua Stein, and Jason Miller, “Synchronizing the Treatment of Multiple Chronic Conditions,” in *Production and Operations Management (POMS)*, Atlanta, GA, 2025.

SKILLS

Programming Languages and Software: Proficient in Python, R; Advanced in MATLAB, SQL, C, Arena

HONORS & AWARDS

USC Viterbi Undergraduate Research Award (2023-2024)
USC Daniel J. Epstein Department of Industrial and Systems Engineering Outstanding Undergraduate Research Award (2023-2024)
USC Center for Undergraduate Research in Viterbi Engineering Fellowship (2022-2023 & 2023-2024)
USC Dean's List (Fall 2022 & Spring 2023 & Fall 2023 & Spring 2024)
Sichuan University Outstanding Student (2021-2022)
Sichuan University Excellent Student Scholarship (2021-2022)
Sichuan University - Pittsburgh Institute Dean's List (2021-2022)
Sichuan University - Pittsburgh Institute Academic Scholarship (2020-2021)
Third Prize, Sichuan Provincial Undergraduate Safety & Emergency Innovation Competition (11/2021)

PROFESSIONAL AFFILIATIONS

Member of INFORMS (08/2024-Present)
Member of Production and Operations Management (02/2025-Present)
Alpha Pi Mu Honors Society (04/2024-Present)