YIFAN LU

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EDUCATION

University of Wisconsin-Madison *Expected: May 2025*
Ph.D. in Industrial and Systems Engineering (Advisor: prof. Oguzhan Alagoz)
Dissertation Title: Optimizing the use of MCED for early diagnosis of multiple cancers

University of British Columbia *May 2020*
B.S. in Chemical Engineering, Minor in Honors Mathematics

KEY RESEARCH PROJECTS DURING PH.D.

Optimal breast cancer prevention policies considering individual's risk attitude
-Developed a Markov decision process model in Julia to optimize breast cancer prevention strategies tailored to women with varying risk attitudes.
-Analyzed two major approaches—utility risk functions and risk measures (mean semi-deviation and average value at risk)—to represent patient risk attitudes, highlighting key differences.
-Identified significant policy insights, such as recommending hormonal therapy at lower lifetime risk thresholds, which challenge current guidelines by USPSTF and ASCO.

Early-cancer detection under uncertainties
-Formulated a stochastic mixed-integer programming model in Julia to optimize cancer prevention policies considering uncertainties like adherence to screening guidelines and screening performance.
-Implemented a two-step importance sampling method to solve the model effectively.

CISNET modeling work on precision screening based on individual's breast cancer risk
-Utilized the University of Wisconsin Breast Cancer Simulation Model, part of the National Cancer Institute-funded CISNET breast cancer working group, to incorporate risk-based screening strategies using C++.
-Developed and evaluated personalized screening strategies based on individual breast cancer risk, aiming to enhance the balance of benefits and harms and improve the efficient allocation of clinical screening resources.
-Filled a gap in existing breast cancer screening guidelines, which primarily focus on average-risk women, potentially leading to over-screening of low-risk women and under-screening of high-risk women.

CISNET modeling work on the latest USPSTF breast cancer screening guidelines
-Updated the breast cancer incidence module in the CISNET model to fit the current breast cancer incidence trend using regression analysis.
-Informed the new US nationwide breast cancer screening policy with updated start age recommendation at 40.

CISNET Modeling work on optimal screening strategies for women with type 2 diabetes
-Conducted systematic meta-analysis to estimate the breast cancer risk for women with diabetes in the model.
-Improved the University of Wisconsin Breast Cancer Simulation Model in C++ to evaluate the effectiveness of various screening scenarios specific for diabetic patients.

PUBLICATIONS

- **Lu, Y.**, Ergun, A. M., and Alagoz, O. Optimal Breast Cancer Prevention Policies Considering Risk Aversion. *Submitted*, Jan 2024.
-Trentham-Dietz, A., Chapman, C. H., Jayasekera, J., Lowry, K. P., Heckman-Stoddard, B. M., Hampton, J. M., ... & Mandelblatt, J. S. (2024), (including **Lu, Y.**. Collaborative modeling to compare different breast cancer screening strategies: a decision analysis for the US Preventive Services Task Force. JAMA.
-**Lu, Y.**, Hajjar, A., Cryns, V. L., Trentham-Dietz, A., Gangnon, R. E., Heckman-Stoddard, B. M., & Alagoz, O. (2023). Breast cancer risk for women with diabetes and the impact of metformin: a meta-analysis. Cancer Medicine, 12(10), 11703-11718.
-Li, Y., Wang, Y., Chen, Y., **Lu, Y.**, Hua, K., Ren, J., ... & Cao, Y. (2022). Deep-Learning-Based Predictive Control of Battery Management for Frequency Regulation. Industrial & Engineering Chemistry Research, 61(24), 8432-8442.

TEACHING EXPERIENCE

Primary instructor for ISYE 517 - Decision making in Healthcare.
September 2023 - December 2023
Full responsibility of organizing and teaching the course. 33 students took this course.

HONORS AND AWARD

Rea C. and David H. Gustafson Scholarship in 2021
Professor Ben-Tzion Graduate Student Award in 2024

COURSEWORK

Linear Programming, Nonlinear Programming, Integer Programming, Dynamic Programming, Probability, Stochastic Process, Simulations, Machine Learning, Artificial Intelligence, Advanced Algorithms, Real Analysis, Complex Analysis, Graph Theory, Chaos.

SKILLS

ML & OR Tools:	Gurobi, HiGHs, PyTorch, Scikit-learn, TensorFlow, Keras
Programming & Others:	Python, R, C++, Julia, Matlab, C, Git