### PARTNERS IN INNOVATION, RESEARCH AND WORKFORCE DEVELOPMENT

# UNIVERSITY of HOUSTON ENGINEERING

# BIOMEDICAL AND COMPUTING FRONTIERS



Taewoo Lee Ph.D. – University of Toronto Assistant Professor, Industrial Engineering

### **Publications**

1. T. Lee, P. Dorali, Z. Shahmoradi, C. Weng, "Personalized teleretinal screening recommendations for patients with diabetes mellitus," Investigative Ophthalmology & Visual Science (IOVS), 61 (7), 829, 2020

2. P. Dorali, R. Limongi, C. Weng, T. Lee, "Cost-effectiveness analysis for population-based teleretinal diabetic retinopathy screening policies in an urban healthcare system," Investigative Ophthalmology & Visual Science (IOVS), 61 (7), 3072, 2020

3. T. C. Y. Chan, T. Lee, D. Terekhov, "Inverse Optimization: Closed-form Solutions, Geometry and Goodness of fit," Management Science, 65 (3), 1115-1135, 2019

4. K. Ghobadi, T. Lee, H. Mahmoudzadeh, D. Terekhov, "Robust inverse optimization," Operations Research Letters, 46 (3), 339-344, 2018

5. T. C. Y. Chan, T. Craig, T. Lee, M. B. Sharpe, "Generalized inverse multi-objective optimization with application to cancer therapy," Operations Research, 62 (3), 680-695, 2014 Dr. Lee conducts studies in the field of operations research with applications in healthcare and medical decision making. His recent research focuses on the theoretical development of machine learning models and data-driven optimization techniques and their applications in cancer therapy, organ transplantation, and diabetic eye disease screening and treatment. His research has been published in top-tier management journals such as Operations Research and Management Science and awarded several prizes including the INFORMS Healthcare Applications Society Best Paper award and the Canadian Operational Research Society Best Paper award. One of the most significant constributions of Dr. Lee's work is the generalization of the inverse optimization methodology to enable preference learning from large-scale human decision data that contain errors and noise.

## **QUANTIFYING PREFERENCES FROM DATA**

Inverse optimization is an advanced and versatile preference learning technique that uses past decision data to quantify a decision maker's preference, which is then used for automated decision making. Dr. Lee is one of the pioneers who has pushed the frontier of knowledge in the field of inverse optimization by applying it to large yet noisy data. In particular, his work in inverse optimization has led to a personalized diet recommender system and an automated radiation therapy treatment planning system.



# MODELING DECISIONS TO ADVANCE HEALTHCARE DELIVERY

Dr. Lee's research has also contributed to the improvement of healthcare delivery systems. One of his recent projects utilizes various machine learning and optimization techniques to design a diabetic eye disease screening program in Harris County in Texas. In particular, in collaboration with Baylor College of Medicine and Harris Health System, Dr. Lee's group has developed a personalized screening decision support tool utilizing telescreening services as well as mobile screening service to reach out to underserved patients in Harris County. His recent research in healthcare optimization is funded by the National Science Foundation and the Minority Research Grant Program of the Centers of Medicare & Medicaid Services.



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