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Personal Statement

I am the Scientific Director of Applied Operations Research program at Mayo Clinic. My research interest focuses on redesigning outpatient scheduling and staffing and space utilization to optimize patient access to care and treatment quality as well as financial performance using operations research and data science approaches. My projects and research activities spanned enterprise practice including developing optimization and simulation methods along with predictive analytics such as artificial intelligence and automation to redesign scheduling, practice workflows, and staffing to balance workload, maximize capacity utilization, and improve patient access across all medical specialties. For the past ten years with Mayo Clinic, I have successfully delivered and systematically implemented solutions to multiple practice departments. This current application builds on my experience with practice needs to advance technology for medical decision making. In addition, I was a faculty member at New Mexico State University for six years and researched in healthcare process improvement domain. I also taught classes such as design of experiments, statistical quality control, inventory control and supply chain management, and multivariate statistical analysis.

Education

The University of Michigan, Ann Arbor, MI, USA
Ph.D., Industrial and Operations Engineering, May 2008
M.S.E., Industrial and Operations Engineering, May 2007
B.S.E., Industrial and Operations Engineering, May 2000

Positions and Scientific Appointments

2024 – present	Section Head of Systems Engineering and Data Science, Health Care Delivery Research, Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, Mayo Clinic
2024 – present	Visiting Professor, Digital Health Economy Group, Center for Security, Health and Sustainable Development, National Cheng Kung University
2023 – present	Scientific Director, Applied Operations Research, Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, Mayo Clinic
2022 – present	Senior Associate Consultant, Health Care Delivery Research, Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, Mayo Clinic
2022 – present	Associate Professor of Health Care Systems Engineering, College of Medicine, Mayo Clinic
2023 – present	Adjunct Professor, Department of Integrated Systems Engineering, College of Engineering, The Ohio State University
2023 – present	Associate Graduate Faculty, Industrial Engineering Department, Iowa State University
2021 – 2022	Associate Consultant, Health Care Delivery Research, Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, Mayo Clinic
2021 – 2022	Associate member to the Graduate Faculty of the University of North Carolina at Charlotte
2019 – 2021	Principal Health Services Analyst, Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery Mayo Clinic
2016 – 2022	Assistant Professor of Health Care Systems Engineering, College of Medicine, Mayo Clinic
2015 – 2019	Senior Health Systems Engineer, Management Engineering & Consulting, Mayo Clinic
2009 – 2015	Assistant Professor, Industrial Engineering, New Mexico State University
2006 – 2009	Marketing Analyst, J&L Industrial Supply, Southfield, MI
2002 – 2005	Graduate Student Instructor, the University of Michigan
2001 – 2002	Industrial Engineer, American Broach & Machine Co., Ann Arbor, MI

Contributions to Science (selected publications)

1. Effective referral triaging and prioritization enhances patient service outcomes, experience and access to care especially for specialized procedures. Appropriate referrals triaging to these specific clinics will lead to timely and proper care, reduce unnecessary appointments for more access, and improve operational efficiency. The current triage process relies mainly on manual assessments and subjective decision-making by nursing staff, leading to inconsistent and suboptimal outcomes and significant time inefficiencies. Therefore, developing a real-time system approach to

automatedly triage the appropriateness and urgency of referrals are critical to both patient outcomes and healthcare operations.

a. Jiang L, **Huang YL**, Fan J, Hunt CL, Eldrige JS. Development and Implementation of Automated Referral Triaging System for Spinal Cord Stimulation Procedure in Pain Medicine. *J Med Syst*. 2025;49(1):14.
b. Jiang Y, Li Q, **Huang YL**, Zhang W. Urgency Prediction for Medical Laboratory Tests Through Optimal Sparse Decision Tree: Case Study with Echocardiograms. *JMIR AI*. 2025;4:e64188.
c. Lin CT, Chao WL, **Huang YL**, Liang SF. Improving Spinal Cord Stimulation Patient Triage: Random Forest Model with Custom Evaluation Functions. *Stud Health Technol Inform*. 2025;329:1175-1179.
d. Jiang Y, **Huang YL**, Watral A, Blocker RC, Rushlow DR. Predicting Provider Workload Using Predicted Patient Risk Score and Social Determinants of Health in Primary Care Setting. *Appl Clin Inform*. 2024;15(3):511-527.

2. Patient scheduling and resource allocation has long been recognized problems in outpatient health care delivery systems, impacting patient and medical staff stress, as well as the quality and efficiency of the medical care. The fact remains that there are few implemented models to design scheduling templates for effective scheduling that are generalized sufficiently to accommodate a variety of outpatient health care settings. My studies are to improve health care delivery by reducing patient wait time and increasing patient access to care while allowing physicians to see the desired number of patients and provide quality care across various outpatient clinic settings and specialties.

a. Bansal A, Richard J, Berg B, **Huang YL**. A sequential follower refinement algorithm for robust surgery scheduling. *INFORMS Journal on Computing*. 2024;36(3),918-937.
b. Moore L, **Huang YL**. Reallocation of chemotherapy appointments in a large health system using a mixed integer linear programming approach. *Health Syst*. 2024;14(2):119-130.
c. **Huang YL**, Bansal A, Berg BP, Tommaso CP, Laughlin RS. Coordination of Intraoperative Neurophysiologic Monitoring Technologist and Surgery Schedules. *J Med Syst*. 2022;46(10):67.
d. Bansal A, Berg B, **Huang YL**. A distributionally robust optimization approach for coordinating clinical and surgical appointments. *IISE Transactions*. 2021;53(12),1311–1323.

3. Real-time scheduling decision tools have been a focus to provide solution for on-the-fly scheduling decision making. Unlike most solutions that require much information being known to develop solutions despite the uncertainty realized at the time of scheduling, the real-time schedule decision support tools allow scheduling to be robust and flexible to adjust for changes. This type of work in patient scheduling context is limited and has strong practical implications to improve operational efficiency and service outcomes.

a. Wang F, **Huang YL**, Ju F. Simulation Optimization Gantry Call-Back Control Method for Proton Therapy Systems. *IEEE Trans Autom Sci Eng*. 2023;20(3),1565-1576.
b. Jiang L, **Huang YL**. Healthcare call center efficiency improvement using a simulation approach to achieve the organization's target. *Int J Healthc Manag*. 2023;17(2),379–388.
c. **Huang YL**, Deisher AJ, Herman MG, Kruse JJ, Mahajan A. Reduce Patient Treatment wait time in a Proton Beam Facility - A Gatekeeper Approach. *J Med Syst*. 2021;45(8):80.
d. **Huang YL**, Bansal A, Berg B, Sanvick C, Klavetter EW, Sandhu GS, Greason KL. An Algorithm for Pairing Interventionalists and Surgeons for the TAVR Procedure. *J Med Syst*. 2021;45(4):53.

4. Scheduling policy refinement and evaluation works include appointment override policy, provider panel size and care team structure decision, and technician scheduling. The goals of these works are to reduce provider burnout, increase staff utilization, and improve patient access to care and care continuity.

a. **Huang YL**, Berg BP, Lampman MA, Rushlow DR. Modeling Family Medicine Provider Care Team Design to Improve Patient Care Continuity. *Qual Manag Health Care*. 2023;32(4):222-229.
b. **Huang YL**, Berg BP, Horn JL, Nagaraju D, Rushlow DR. Balancing Clinician Workload Through Strategic Patient Panel Designs. *Qual Manag Health Care*. 2023;32(3):137-144.
c. **Huang, YL**., Sikder, I. & Xu, G. Optimal override policy for chemotherapy scheduling template via mixed-integer linear programming. *Optim Lett*. 2022;16(5),1549–1562.
d. **Huang YL**, Shahraki N, Wallin EM, Klavetter EW, Klarich KW. Provider time allotment tracking tool to effectively manage assignment commitments. *J Hosp Adm*. 2021;10(3),10-16.