

YUKTI KATHURIA

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<https://yukti-k.github.io>

SUMMARY

Research focus: My research lies at the intersection of operations management, healthcare operations, data-driven decision-making, and applied analytics. I develop and apply statistical, computational, and optimization-based methods to study complex operational systems, with particular emphasis on healthcare delivery, resource allocation, risk stratification, and decision-making under uncertainty.

Research goals: My goals are to: (1) develop rigorous analytical methods for operational and managerial decision-making using real-world and high-dimensional data; (2) study complex, evolving systems in which decisions must be made under uncertainty, limited information, and resource constraints; and (3) translate statistical, predictive, and optimization models into actionable insights for improving system performance, resource allocation, service delivery, and organizational decision-making.

Methods and applications: My work draws on computational statistics, longitudinal and high-dimensional data analysis, statistical and machine learning, probabilistic graphical models, mathematical optimization, simulation, network-based modeling, and sequential decision methods. These approaches support applications in healthcare operations, service operations, resource allocation, capacity and access planning, risk stratification, decision-support systems, and data-driven operational improvement.

EDUCATION

Ph.D. in Industrial Engineering, UMass Amherst

2023 – Present

Advisor: Muge Capan

M.S. in Aerospace Engineering, UIUC

2018 – 2020

B.S. in Aerospace Engineering, UIUC

2014 – 2018

EMPLOYMENT AND INTERNSHIPS

Research Internship, OptiStatim LLC, Remote

Supervisor: Brian Nathanson

Jun. 2026 - Aug. 2026

- Integrated multi-source healthcare and socioeconomic datasets across 39 states in Stata to analyze geographic variation in discharge destination and hospital length of stay for head trauma patients; identified seven significant socioeconomic factors relevant to post-acute care planning.
- Developed a sepsis benchmarking analysis using the Prolonged Acute Mechanical Ventilation Ratio, stratifying states by utilization and identifying 10+ socioeconomic factors associated with variation in post-acute care patterns.
- Built reproducible workflows for data integration, imputation, feature engineering, normalization, statistical analysis, and visualization, producing 13 analytical summaries for healthcare decision support.

Data Science Fellow, NYC Data Science Academy, Remote

Jan. 2021 – Apr. 2021

- Developed machine learning models using Lasso regression, random forests, and XGBoost for housing-price prediction, achieving a top-25
- Led a five-member team analyzing American Community Survey and Zillow rental data using SQL,

Google BigQuery, Python, and Jupyter Notebook; performed data integration, feature engineering, and predictive modeling of rental-market outcomes.

- Built an R Shiny application to analyze user and seller behavior in a consumer-to-consumer marketplace and performed web scraping and exploratory analysis of 1,000+ online bookstore listings.

Data Science and Machine Learning Internship, Condition Black, Remote

Supervisor: John Wethington

Aug. 2020 – May 2021

- Developed data-processing workflows for speech and text data using Python, PyTorch, Silero models, regular expressions, and Microsoft Azure natural language processing tools.
- Implemented named entity recognition and sensitive-data identification methods and contributed to company policies governing AI-enabled data handling.

SELECTED PRIOR RESEARCH EXPERIENCE

Pointing Payload Team Lead, Cooling, Annealing and Pointing Satellite (CAPSat)

Engineering System Design Laboratory, UIUC

2016 – 2018

- Led a nine-member team developing and validating the satellite pointing payload, including strain-actuated solar arrays, hardware-in-the-loop experiments, structural analysis, component qualification, and payload integration.
- Developed piezoelectric actuation and strain-gage sensing systems and performed thermal-vacuum, calibration, and finite-element testing to support payload design and validation.
- Presented payload development and validation results to NASA during Preliminary and Critical Design Reviews.

RECENT PUBLICATIONS AND PREPRINTS

Order-Based Bayesian Network Modeling of Early Detection and Post-Diagnosis Control for Cardiovascular Disease Risk in Type 2 Diabetes [\[preprint\]](#)

Yukti Kathuria, Kristen Miller, Elizabeth Selden, William Gallagher, Muge Capan

Summary: We develop a temporally structured Bayesian network using EHR data from 9,450 primary care patients to quantify relationships between early T2D detection, post-diagnosis glycemic control, and subsequent CVD risk. The model identifies substantial risk heterogeneity, with predicted first-year CVD risk ranging from 5.2% to 28.9% across low- and high-risk groups, and first-year poor glycemic control ranging from 1.6% to 55.1%. Incorporating early post-diagnosis clinical outcomes further refines long-term CVD risk stratification, reaching 33.5% among high-risk individuals while maintaining predictive performance comparable to conventional machine learning models.

Analysis of multi-level barriers to physical activity among nursing students using regularized regression [\[link\]](#)

Muge Capan*, Lily Bigelow*, Yukti Kathuria*, Amanda Paluch, Joohyun Chung.

Summary: We developed a quantitative scoring framework to measure barriers to physical activity and applied regularized regression to identify the strongest predictors among 163 nursing students. The modeling approach integrated multilevel individual, social, and behavioral factors and identified intrinsic motivation, social and emotional support, education, and health-technology use as key predictors of higher barrier scores.

MANUSCRIPTS IN PREPARATION

- **A Nationwide Assessment of Variation in Hospital Length of Stay for Trauma Patients in a Coma for More than One Hour**
Yukti Kathuria, Brian Nathanson, Muge Capan.

FULL LIST OF PUBLICATIONS

- **Order-Based Bayesian Network Modeling of Early Detection and Post-Diagnosis Control for Cardiovascular Disease Risk in Type 2 Diabetes** [\[link\]](#)
Yukti Kathuria, Kristen Miller, Elizabeth Selden, William Gallagher, Muge Capan.
medRxiv, 2026. Manuscript under revision for *PLOS Digital Health*.
- **Bridging the Gap: The Role of Analytics Translators in Informatics** [\[link\]](#)
R. Mahalingam, P. Sarathy, M. K. Mannava, Yukti Kathuria.
International Journal of Applied Informatics and Media Design, 5(1), 32–41, 2025.
- **Analysis of Multi-Level Barriers to Physical Activity Among Nursing Students Using Regularized Regression** [\[link\]](#)
Muge Capan, Lily Bigelow, Yukti Kathuria, Amanda Paluch, Joohyun Chung.
PLOS ONE, 19(5), e0304214, 2024.
- **Multi-Criteria Clinic Allocation in Massachusetts to Reduce Access to Healthcare Disparities** [\[link\]](#)
Yukti Kathuria, Muge Capan, Jessica Boakye, Chaitra Gopalappa.
In *Proceedings of the IISE Annual Conference & Expo*, 2024.
- **Sensor Fusion for Attitude Determination** [\[link\]](#)
V. Vedant, Yukti Kathuria, A. Ghosh.
In *41st Annual AAS Rocky Mountain Section Guidance and Control Conference*, 2018.

CONFERENCE PRESENTATIONS AND PUBLICATIONS

- **Dynamic Cardiovascular Risk Stratification in Type 2 Diabetes Using Bipartite Stochastic Block Models**
Yukti Kathuria, Kristen Miller, Elizabeth Selden, William Gallagher, Muge Capan.
INFORMS Annual Meeting, 2026.
- **An Order-Based Bayesian Network for Analyzing Diagnostic Delays and Type 2 Diabetes-Related Health Outcomes in Primary Care**
Yukti Kathuria, Kristen Miller, Elizabeth Selden, William Gallagher, Laura Schubel, Sonita Bennett, Muge Capan.
INFORMS Annual Meeting, 2025.
- **Analysis of Social Determinants of Health to Risk-Stratify Type 2 Diabetes Pathways**
Yukti Kathuria, Muge Capan, Sonita Bennett, Kristen Miller, Elizabeth Selden, William Gallagher.
INFORMS Annual Meeting, 2024.
- **Multi-Criteria Clinic Allocation in Massachusetts to Reduce Access to Healthcare Disparities** [\[link\]](#)
Yukti Kathuria, Muge Capan, Jessica Boakye, Chaitra Gopalappa.
IISE Annual Conference & Expo, 2024.

POSTER PRESENTATIONS

- **An Order-Based Bayesian Network to Analyze Diagnostic Delay and Type 2 Diabetes-Related Outcomes**
Yukti Kathuria, Muge Capan, Kristen Miller, Elizabeth Selden, William Gallagher.
INFORMS MIF Student Poster Competition, October 2025.
- **Analysis of Post-Diagnosis Follow-Up Processes in Primary Care Using Bayesian Networks**
Yukti Kathuria, Muge Capan, Sonita Bennett, Kristen Miller, Elizabeth Selden, William Gallagher.
UMass LIRA Workshop, May 2025.
- **Analysis of Diagnostic Error Risk Factors and Resource Needs in Primary Care Using Bayesian Networks** [\[poster\]](#)
Yukti Kathuria, Muge Capan, Sonita Bennett, Kristen Miller, Elizabeth Selden, William Gallagher.
UMass Amherst College of Engineering Graduate Research Symposium, March 2025.
- **Multi-Level Factors of Physical Health and Well-Being in the Nursing Profession** [\[poster\]](#)
Muge Capan, Amanda Paluch, Joohyun Chung, Yukti Kathuria, Lily Bigelow.
Elaine Marieb Center for Nursing and Engineering Innovation Symposium, October 2023.

FELLOWSHIPS AND AWARDS

- **UMass Leadership Fellow**, 2025–2027
Selected as one of 24 fellows from 193 applicants for an NSF-funded leadership program focused on mentorship, academic leadership, and institutional change.
- **Murthy Fellowship**, UMass Amherst Department of Mechanical and Industrial Engineering, 2025–2026
Awarded for academic excellence and to support graduate research.
- **Second Place Team**, IISE Data Analytics and Information Systems Division Student Analytics Competition, 2025
- **Winning Team**, Technology Association of Georgia Master Modeler Competition, 2024
- **UMass Amherst Department of Mechanical and Industrial Engineering Fellowship**, Spring 2024
- **Jo Ann Haynes Platt and Daniel Wall Platt Memorial Award**, University of Illinois Urbana-Champaign, 2017
- **FMC Award of Excellence**, University of Illinois Urbana-Champaign, 2014
- **Lee H. Sentman Scholarship**, University of Illinois Urbana-Champaign, 2014

ACADEMIC SERVICE

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| • Student Volunteer , IISE Modeling and Simulation Division Board | 2026–Present |
| • Paper Reviewer , Winter Simulation Conference | 2025 |
| • Paper Reviewer , IISE Annual Conference | 2025 |
| • Graduate Student Representative , UMass MIE Graduate Leadership Council | 2023–2025 |
| • Program Organizer , UMass MIE Diversity, Equity, and Inclusion Committee | Fall 2024 |
| • Blog Manager , UMass Student Chapter of INFORMS | 2023–2026 |

TEACHING EXPERIENCE

- **Teaching Assistant, University of Massachusetts Amherst**
 - ENGIN 113 Introduction to Mechanical and Industrial Engineering Fall 2026
- **Project Lead & Instructor, UMass Summer Engineering Institute** Summer 2025
- **Teaching Assistant and Course Development, University of Illinois Urbana-Champaign**
 - AE 199 Design, Build, Fly Fall 2018
- **Course Grader, University of Illinois Urbana-Champaign**
 - AE 461 Structures & Control Lab Spring 2020, Spring 2021
 - AE 370 Aerospace Numerical Methods Spring 2018
 - AE 321 Mechanics for Aerospace Structures Fall 2017
 - AE 202 Aerospace Flight Mechanics Spring 2017
 - MATH 125 Elementary Linear Algebra Fall 2016

SELECTED COMPETITIONS

- **IISE DAIS Student Analytics Competition: Healthcare Staffing Forecasting** 2025
 - Reconstructed seven years of staffing histories by matching 100 anonymized facilities to more than 24,000 nursing homes in public CMS datasets, expanding training data from 1 quarter to 29 quarters.
 - Engineered 70+ longitudinal features capturing staffing, occupancy, and temporal patterns and developed forecasting models for nursing-home workforce demand.
 - Reduced prediction error for CNA demand to approximately 26% and presented operational findings at the 2025 IISE Annual Conference.
- **Technology Association of Georgia Master Modeler Competition** 2024
 - Analyzed 750+ nonprofit donor and auction records using RFM segmentation, predictive modeling, and data visualization.
 - Developed a donor-churn model achieving ROC-AUC of 0.77 and identified five behavioral donor segments for targeted engagement.
 - Evaluated multi-year fundraising trends across 15+ auction categories to inform sourcing and pricing decisions.

SKILLS

- **Programming Languages:** Python, R, Stata, SQL, MATLAB
- **Statistical and Analytical Methods:** Regression, regularized regression, Bayesian networks, probabilistic graphical models, stochastic block models, longitudinal data analysis, risk stratification, optimization, predictive modeling, time-series forecasting, clustering and segmentation
- **Healthcare Data:** Electronic health records (EHRs); Centers for Medicare & Medicaid Services (CMS) datasets; Healthcare Cost and Utilization Project (HCUPnet); Kaiser Family Foundation (KFF) state health facts; America's Health Rankings; Long-Term Services and Supports (LTSS) State Scorecard; observational health data; primary care data.
- **Data Analysis and Visualization:** Tableau, feature engineering, data integration, preprocessing, statistical visualization