

# BIOMEDICAL & COMPUTING FRONTIERS



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#### Publications

1. B. Majeed, J. Peng, A. Li, Y. Lin and R. Delgado. Forecasting the demand of mobile clinic services at vulnerable communities via integrating multi-source data. *IIE Transactions on Healthcare Systems Engineering*, 2020.
2. A. Khabazian and J. Peng. Vulnerability analysis of the financial network. *Management Science*, 65(7), 3302-3321, July, 2019.
3. H. Luo, X. Bai, G. Lim and J. Peng. Global algorithms for quadratic programming with a few negative eigenvalues based on successive linear optimization and convex relaxation. *Mathematical Programming: Computation*, 11(1), 119-171, March, 2019.
4. J. Birge, A. Khabazian and J. Peng. Optimization Modeling and Techniques for Systemic Risk Assessment and Control in Financial Networks. *INFORMS TutORials 2018: Recent Advances in Optimization and Modeling of Contemporary Problems*, Edited by E. Gel and L. Ntaimo. 2018.

Dr. Peng conducts research in optimization modeling, algorithm design, and applications in health-care, financial engineering and big data. He is the recipient of several awards from both academic and non-academic communities such as INFORMS, the Society of Mathematical Optimization, and Morgan Stanley. He received the College Research Excellence Award in 2014. His Research Project on Mobile Clinic Healthcare was highlighted by the National Science Foundation and reported by Science 360 in 2018. His current research interest lies in risk assessment and control in healthcare and financial networks.

#### DATA-DRIVEN APPROACHES FOR IMPROVING HEALTHCARE SERVICES TO UNDERSERVED VULNERABLE COMMUNITIES



Owing to their easy accessibility and relatively low-cost, mobile health clinics (MHC) play an important role in providing healthcare service to vulnerable, at-risk communities. At present, there are over 2,000 MHC programs operating in the country that provide over 6 million visits annually. However, little is known on how to effectively allocate the limited medical resources to improve the service coverage in underserved communities.

Partnered with colleagues from the Texas Medical Center and Texas Children Hospital in Houston, Dr. Peng's group has developed new learning/optimization models to integrate data from multi-sources to accurately predict the demand in communities such as schools and census tracts, to effectively allocate medical resources and schedule visits to improve the service coverage of the collaborating MHC programs within the targeted communities.

Although these models were able to predict the demand for immunizations in target communities, this group contemplates the use of these models to extend to predicting demands for other services such as cancer screening, diabetes screening, and even COVID-19 vaccination in targeted communities.