

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

**DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

Seminar announcement

June 21, 10:00 – 11:00

Room T4, Building 2A, DIETI – Via Claudio, 21 – NAPOLI



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Optimization of a mobile clinic routing and scheduling problem in equitable vaccination outreach

Abstract Vaccination is critical to public health, but access is limited in hard-to-reach areas due to physical and transportation limits. In such cases, an outreach strategy is preferred, where mobile health staff travel from depot to selected locations to provide vaccinations. In addition to the routing of mobile clinics, the work schedule of health staff is also essential for outreach. In this study, we model the mobile clinic routing and scheduling problem in outreach as a mixed-integer nonlinear program, which aims to minimize the total cost

by jointly determining clinic routing, demand allocation, and scheduling of the medical staff and vehicles. Specially, endogenous demand is considered where demand decreases nonlinearly with distance to the nearest mobile clinic. The model is further reformulated as a mixed-integer linear program, and then exactly solved using a logic-based benders decomposition approach. Extensive computational experiments are conducted to verify the algorithm efficiency and produce valuable managerial insights.

Lecturer short bio: *Mingyao Qi is professor at the Shenzhen International Graduate School, Tsinghua University, China. He mainly focuses on optimization of complex logistics systems, covering applications like facility location, network design, vehicle routing, and robot scheduling. His research has been published in top international journals such as Operations Research, European Journal of Operational Research, Transportation Science, Transportation Research Part B/E, Omega, and so on. He also devoted himself to developing core logistics optimization algorithms and systems for industries likes e-commerce, third-party logistics, last-mile delivery, airport logistics, and so on. He serves as the co-chair of the International Conference on Transportation Logistics (T-LOG), and Executive Advisory Board of Transportation Research Part E.*

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