

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

PHD PROGRAM IN  
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

PHD PROGRAM IN INFORMATION AND TECHNOLOGY FOR HEALTH

## Seminar announcement

Friday 28<sup>th</sup> June 2024, Time: 10:00 - 11:00

Room I4, via Claudio 21 – Naples



Prof. A.M. Rodríguez-Chía

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## Including elastic demand in the hub line location problem

**Abstract:** This talk deals with an extension of the hub line location problem considering demand elasticity with respect to travel times. The proposed model aims to capture the impact the hub network topology has on demand. The objective is to maximize the total revenue generated by each unit of demand using the hub line. We propose mixed-integer nonlinear formulations to model this problem. We study some properties of the nonlinear objective function associated with these formulations. Due to the inherent complexity involved in solving these

nonlinear formulations with state-of-the-art solvers, we also present alternative mixed-integer linear programming formulations. Computational results compare the proposed formulations and the benefits of the presented model using benchmark instances commonly used in hub location. Moreover, a sensitivity analysis study is carried out with real data from the city of Montreal, Canada, to demonstrate the added value of incorporating demand elasticity when using the proposed model for public transportation planning.

**Lecturer short bio:** *A.M. Rodríguez-Chía is full professor of the Dpt. of Statistics and Operations Research of Cádiz University, since 2015. Since the beginning of his research activity, he has been working in continuous and discrete optimization problems, with particular focus on location problems. In addition, his research has been devoted to the study of optimization of large-scale complex networks and the analysis of data science problems from the point of view of optimization. Recently, he is also involved in the optimization of reconstruction of nano-scale particles using Electronic Tomography. Regarding the research projects, he has participated since 2007, without interruption, as a main researcher in projects financed by the National/State R&D&I Plan of the Spanish Ministry. He was main researcher of the Spanish network on Locational Analysis and Related Problems, 2012-2019, His interest in bringing mathematical knowledge to the industry and society has led him to also collaborate and conduct contract projects funded by corporations, as for instance NanoMEGAS (Optimization on the reconstructions of nanoparticles with Electron Tomography), Orbystat and Satinel System (Optimization in road transportation). He has supervised five doctoral theses, one of them obtained the extraordinary doctorate award. He is member of the editorial board of the journal Networks (Wiley).*

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