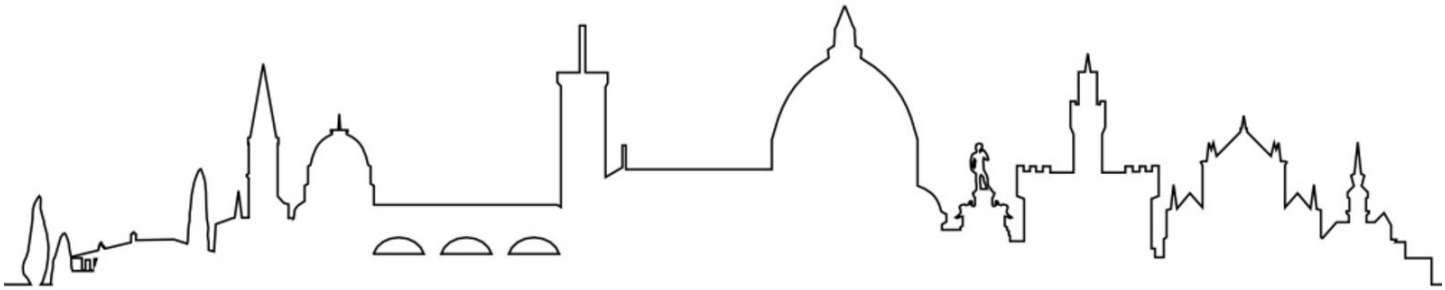

FLorence OPtimization talkS

Organized by

(NODA) Numerical Optimization and Data Analysis group (DIEF)
(GOL) Global Optimization Laboratory (DINFO)
University of Florence

April 29th 2026

Britt van Veggel

Phd student at University of Amsterdam

Time&Location: 2:00 p.m. – Room 221 – CDD Morgagni

Title: ***Heatmaps for maximum coverage facility location optimization***

Abstract: We propose an efficient method to generate so-called heatmaps for the maximum coverage facility location problem. Heatmaps are geospatial representations in which each region is colored according to the expected value or distribution of a given variable, assuming a facility were to be placed within this region. We discuss three applications of this methodology. The first application is that such a heatmap gives the user insight in other (almost) optimal locations for the facility for both (almost) highest coverage and mean traveling distance. Secondly, the heatmaps can be used as a post-processing improvement method for solutions found using a coordinate-based input. Lastly, the heatmaps can be used as a pre-processing method to improve the initial discrete set of potential facility locations, and with that the quality of the solution.

We develop two variants of the method: one can be used in case the distances are Euclidean, and one for the case that the distance is calculated via the roads. The methodology is tested on a case that aims to find optimal locations for water wells in West Darfur.

The numerical results show that the pre-processing stage allows the user to reach full coverage with 15% less facilities (7707 rather than 9098).