

Thomas POCK

“Vision, Optimization and Learning”

In this PGMO lecture I will talk about (non-) convex and non-smooth optimization methods with applications to variational problems in computer vision. The course addresses accelerated gradient descent methods and their generalization to non-convex optimization problems, primal dual methods, and hybrid algorithms that combine continuous optimization with dynamic programming. I will show how to solve practical problems that occur in computer vision, such as image restoration, stereo, optical flow, and medical image reconstruction. In addition to more theoretical considerations, this lecture will also show how some of the algorithms can be practically implemented in Python (using jupyter notebooks) . Participants are therefore invited to bring their laptop with a running version of Python to participate in the practical tasks. Finally, will also show how to use machine learning techniques to learn better models from data.