

During the last two decades, the concept of sparsity radically changed the way inverse problems are tackled. The first part of this course will introduce the very basics of the sparse modeling of signals and its use to solve standard inverse problems (e.g. denoising, deconvolution, component separation, inpainting, etc.), with a particular focus on imaging problems. Sparsity further gave birth to a revolutionary sampling theory, coined compressed sensing. The second part of this course will focus on the fundamentals of compressed sensing and its applications in various fields of physics: radio-interferometry, medical imaging and optics.