

Title: Inverse modeling in inverse problems using optimization

Lecturer: Mila Nikolova

Affiliation: CMLA, ENS Cachan, CNRS, 61 Av. President Wilson, F-94230 Cachan, France

Email : nikolova@cmla.ens-cachan.fr

Homepage: <http://mnikolova.perso.math.cnrs.fr>

Outline

Numerous (or most) inverse problems are defined as the solution of an optimization problem. There resides a still open fundamental question: how to define an optimization problem so that its solution satisfies the specific requirements of the application at hand? Years ago we realized that a rigorous basis to construct such an optimization problem relies on a good knowledge of the essential features exhibited by its solutions. One could retort that it's like a Gordian knot... Nonetheless, it appeared workable and many results—both theoretical and practical—were obtained in this way. An intrinsic mutual relationship between optimization and modeling is thus established. Even if the question is tricky, many successful results have been obtained. My lectures will give a flavor of the rich possibilities offered by this standpoint.

Let us note that these possibilities extend far beyond inverse problems.