1086-35-1270 **Guillaume Bal***, gb2030@columbia.edu. *Hybrid inverse problems and redundant systems of partial differential equations.*

Medical imaging modalities are most useful when they combine high resolution with high contrast. Hybrid modalities, also called coupled-physics or multi-wave modalities, satisfy this constraint by using the physical coupling between a high-contrast, low-resolution modality and a high-resolution, low-contrast modality.

Mathematically, these modalities involve in a first step, not considered in this talk, the resolution of a classical high-resolution boundary value inverse problem, and in a second step, the quantitative reconstruction of parameters of interest from the internals functionals obtained in the first step.

In several settings, the second step may be recast as a redundant system of partial differential equations. Depending on the redundancy in the system, which is related to the amount of acquired measurements, we aim to answer the following questions: (i) are the parameters of interest uniquely characterized by available measurements? (ii) are reconstructions stable with respect to errors in the measurements? (iii) are explicit reconstruction procedures available? (Received September 20, 2012)