Edge detection for solving hybrid inverse problems

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In this talk we consider a problem of quantitative photoacoustic imaging.
The problem decomposes into the photoacoustic imaging problem and an inverse problem (parameter estimation problem) for the fluence in a stationary diffusion equation. When one assumes piecewise constant diffusion, scattering, and Grueneisen parameters, respectively, then this problem can be decomposed into edge detection problem for the fluence and its derivatives and a parameter selection process based on the jump relations of the diffusion equation. Novel edge detection algorithms tuned to these problems are presented.

This is joint work with Elena Beretta (Milan), Markus Grasmair (Trondheim), Monika Muskieta (Wroclaw), Wolf Naetar (Vienna)