# INVERSE PROBLEMS, DESIGN AND OPTIMIZATION

## MARCELO J. COLAÇO[*], HELCIO R. B. ORLANDE[†], GEORGE S. DULIKRAVICH[**], AND IRENEUSZ SZCZYGIEL[††]

[*] Federal University of Rio de Janeiro
PEM/COPPE-UFRJ, Caixa Postal 68503, Rio de Janeiro, RJ, 21941-972, Brazil
colaco@ufrj.br

[†] Federal University of Rio de Janeiro
PEM/COPPE-UFRJ, Caixa Postal 68503, Rio de Janeiro, RJ, 21941-972, Brazil
helcio@mecanica.ufrj.br

[**] Florida International University
10555 West Flagler Street, EC 3462, Miami, Florida, 33174, USA
dulikrav@fiu.edu

[††] Silesian University of Technology
Pokój C-201, ul. Konarskiego 22, 44-100, Gliwice, Poland
iszczygiel@polsl.pl

**Key words:** Inverse Problems, Design, Optimization.

## ABSTRACT

When performing real life optimization or parameter identification, usually some level of uncertainty is intrinsically present in the models used. Such uncertainty can be present in the measured boundary and/or initial conditions, physical properties of the media, or even the mathematical model that does not represent the physical phenomena with a high degree of fidelity. When analysis of candidate solutions is very expensive or time consuming, it is a common practice to use metamodels or low fidelity models to represent a more complex problem, in order to save time and computational resources in large scale optimizations and inverse problems. Thus, there is a recognized and rapidly growing need for the development of reliable, accurate and computationally efficient methods to deal with such uncertainties in inverse problems, design and optimization of real life nonlinear multi-disciplinary problems.

The proposed minisymposium should bring together international experts on these subjects and serve as a forum for comparing the capabilities and drawbacks of conceptually different algorithms, thus advancing the fields of inverse problems, design and optimization under uncertainties simultaneously.