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INVERSE PROBLEMS, DESIGN AND OPTIMIZATION IN HEAT TRANSFER
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Inverse problems, design theories and multi-objective constrained optimization strategies are three areas of advanced research of great interest for practicing engineers and designers. These three major areas of research have a number of things in common. For example, many methodologies for solving inverse problems employ optimization algorithms. On the other hand, optimization techniques generally do not employ methods of inverse design, which could potentially reduce the number of time-consuming analysis required by the typical evolutionary optimization algorithms. Similarly, design theory is commonly not used by the optimization community, where formulation of the appropriate multiple objectives and system-of-systems design formulations are often performed using intuition and personal experience.

The solution of inverse, design and optimization problems needs to cope with uncertainties in the mathematical model of the forward problem and its numerical solution, measured data, boundary conditions, properties of the media, and others. As a result, statistical techniques play a fundamental role in practical applications.

The objective of this minisymposium is to offer a forum on inverse, design and optimization problems in heat transfer. Contributions are particularly welcome on novel applications, such as in biomedicine, small scale processes, high temperatures and high pressures, materials design, as well as on statistical solution techniques, like those within the Bayesian framework.