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Inverse Problems Seeking Solutions

Inverse problems arise in many industrial applications. I would like to take this opportunity to present three problems whose solution will be of great interest to industry. All the problems are to a great extent unsolved.

1. Design of shapes with prescribed pressure profiles (from the auto industry)
2. Characterization of fiber optical waveguides (from an optical communication company)
3. Nondestructive evaluation of spot welds (also from the auto industry)

In each case, I will start with a description of the model, what is measured or given, and what is to be determined. Specific mathematical questions will be posed. The objective of this presentation is to start new mathematical research in these important applications.