Issues in Optimization

This 90 minutes lecture to be delivered via telelink addresses a class of MIT undergraduates unrolled in Engineering Design and Rapid Prototyping Course. The students have been introduced to the basic optimization concepts of design variables, design space, objective function, constraints and numerical search methods. Building on this elementary basis, the purpose of the lecture is to make the students aware of a broad range of theoretical and practical issues that arise when optimization is applied in real-life engineering. To that end a gamut of topics is presented with emphasis on the qualitative exposition rather than in-depth mathematics. The topics include:

- How to tell whether optimization is needed
- Optima: Sharp & Shallow; Local & Global
- Multiobjective optimization
- Optimization across the walls of conventional practice
- Systems optimization: couplings, sensitivities, what to optimize for
- Approximations
- Invention by optimization? The role of human mind.
- Multiprocessor computing – a new world for optimization.

Time will be allowed after each section of the presentation for Q & A from both the MIT and local audiences.
Dr. Jaroslaw Sobieski