

**ΔΙΑΛΕΞΗ ΠΕΜΠΤΗ 8 ΙΟΥΝΙΟΥ 2017, 11:00**  
**PC Lab Σχολής Μηχανολόγων**

**MULTI-DISCIPLINARY  
INVERSE DESIGN AND OPTIMIZATION**

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**ABSTRACT**

This lecture will conceptually summarize and briefly present our diverse methods for inverse design and constrained optimization. The results to be presented will involve:

1. Inverse detection of thermal and elasticity boundary conditions on inaccessible boundaries,
2. Inverse determination of temperature-dependent thermal conductivity of arbitrary solids,
3. Inverse determination of spatially varying heat capacity and thermal conductivity in solids,
4. Inverse determination of spatial variation of Young's modulus of elasticity in solids,
5. Inverse shape design of 2-D airfoils and 3-D wings using existing flow-field analysis codes,
6. Optimization of 3D transonic wing shapes and planforms for minimum aerodynamic drag,
7. Multi-objective constrained optimization of winglets and bladelets using NSE solvers,
8. Optimization of coolant flow passage configurations in internally cooled 3-D turbine blades,
9. Inverse design of operating conditions for very high heat flux cooling of micro-electronics,
10. Constrained reduced order modeling for multiphase flow analysis,

This PowerPoint presentation will include several short computer generated animations.

*About the lecturer:*

Prof. George S. Dulikravich (Ph.D., Cornell'79; M.Sc., Minnesota'75; Dipl.-Ing., Belgrade'73) worked as a NRC Associate Fellow at NASA LeRC, a Visiting Scientist at DFVLR-Goettingen, Assistant Professor at University of Texas-Austin('82-'86), Associate Professor at the Pennsylvania State University ('86-'99), Professor at Univ. of Texas at Arlington ('99-'03), and MME Department Chairman ('03-'09) and Professor ('03-present) at Florida International University. He has authored and co-authored over 500 technical publications in diverse fields involving computational and analytical fluid mechanics, subsonic, transonic and hypersonic aerodynamics, theoretical and computational electro-magneto-hydrodynamics, conjugate heat transfer including solidification, computational cryobiology and epidemiology, acceleration of iterative algorithms, computational grid generation, multi-disciplinary aero-thermo-structural inverse problems, design and constrained optimization in turbomachinery, fluid flow and heat transfer in networks of micro/nano passages and arrays of pin-fins, and multi-objective optimization of chemical compositions of alloys. He is the founder and Editor-in-Chief of the international journal on *Inverse Problems in Science and Engineering* (founded in 1994) and an Associate Editor of ten additional journals. He is also the founder, chairman and editor of the sequence of International Conferences on Inverse Design Concepts and Optimization in Engineering Sciences (ICIDES) and International Symposium on Inverse Problems, Design and Optimization (IPDO). Professor Dulikravich is a Fellow of the American Academy of Mechanics, a Fellow of the American Society of Mechanical Engineers, a Fellow of Royal Aeronautical Society, and an Associate Fellow of the American Institute of Aeronautics and Astronautics. He was a member of the Texas Institute for Computational Mechanics (TICOM) at the University of Texas at Austin and a member of the Center for Space Propulsion and the Center for Gas Turbines and Power at the Pennsylvania State University. He is the founder of the interdepartmental Multidisciplinary Analysis, Inverse Design and Optimization (MAIDO) Institute at the University of Texas at Arlington and the founder of Multidisciplinary Analysis, Inverse Design, Robust Optimization and Control (MAIDROC) Lab at Florida International Univ.