

## Systems and Design

The *Journal of Mechanical Design* has a long history of publishing research work on system design. For example, “mechanical systems” was the term used primarily for JMD research papers on multi-body dynamics that has now mostly migrated to the ASME transactions journals on computational and nonlinear dynamics or dynamic systems, measurement and control. The term “system design” invokes now more the idea of a device that is made up of subsystems and components that must work together, or devices that must be analyzed from the viewpoint of several disciplines. The term “engineered” systems is often used to distinguish human artifacts from natural systems, like, say, ant colonies that are studied in “complex systems” research. And then there are “complex engineered systems,” a topic that is receiving significant attention beyond the confines of typical engineering research, like many types of transportation vehicles and their associated infrastructures.

JMD has issued the Call for Papers below for a special issue scheduled for 2011. To set the stage I have asked Christina L. Bloebaum of the University of Buffalo and Director of the National Science Foundation’s Program on Engineering Design and Innovation, and Anna-Maria R. McGowan, Agency-Level Technology Integration Manager at the National Aeronautics and Space Administration Langley Research Center, to share with us some thoughts on the challenges we face in addressing these complex engineered systems design problems. I am delighted to welcome their guest editorial in the present issue.

**Panos Y. Papalambros**  
**Editor**



### ASME Journal of Mechanical Design *Special Issue on Designing Complex Engineered Systems*

The increasing complexity of engineered systems is causing schedule delays, driving up costs, and creating countless new problems for designers and engineers. Factoring in the challenges associated with global product development, it becomes imperative to rethink how complex engineered systems are being designed. Consequently, the *ASME Journal of Mechanical Design* solicits submissions for a special issue on Designing Complex Engineered Systems. Topics can include, but are not limited to:

- Design representation and evaluation of system complexity
- Design process reuse, adaptive and variant design, and development and assembly of systems using manufacturing and component libraries
- Simulation-based modeling and ontologies for complex engineered systems
- Methods for handling interactions, tradeoffs and emergent behavior
- Requirements setting and flow down, formulating objectives
- Decomposition and partitioning methods and methods to support system composition
- Uncertainty quantification and management
- Architecture, platform, and modular design
- Multi-physics, multi-scale, multi-disciplinary design of hierarchical/nonhierarchical systems
- Systems of systems design
- Design for robustness, reliability, and risk reduction
- Inverse problems in designing complex engineered systems
- Distributed/collaborative design and decision making
- Team interactions, group dynamics, distributed workflows, and design convergence
- Designing for and managing system behavior and total life cycle issues
- Verification and validation models and methods

Application areas can include, but are not limited to, large- to small-scale systems in aerospace, automotive, biomedical, consumer products, manufacturing, energy, infrastructure, space, and transportation. We will also consider high quality papers that deal with educating students in the design of complex engineered systems. Finally, we encourage papers from authors in fields outside of mechanical engineering (e.g., behavioral science, business, cognitive science, decision theory, economics, network analysis, psychology, public policy, etc.).

#### Submission Instructions

Please submit your paper to ASME at <http://journaltool.asme.org/Content/index.cfm> and note on the cover page that your paper is intended for the special issue on designing complex engineered systems. Please also email the Editor, Dr. Panos Papalambros at [editor@asmejmd.edu](mailto:editor@asmejmd.edu), to alert him that your paper is intended for the special issue. Information about the *Journal of Mechanical Design* can be found at <http://www.asmejmd.org/index.php>. Please note that a limit of 12 journal pages without ASME page fees will be observed.

#### Publication Target Dates

Authors submit papers by: January 15, 2011  
Initial review completed by: May 15, 2011  
Publication of special issue by: October 2011

Papers submitted by January 15, 2011 will be reviewed in time for inclusion in the special issue. Papers received after that date will still be considered for the special issue, if time and space permits. Otherwise, accepted papers will appear in a later issue of the journal.

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