

**DANIEL J. EPSTEIN DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING**

EPSTEIN INSTITUTE SEMINAR • ISE 651 SEMINAR

***Geometric Interoperability for Engineering
Applications****

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ABSTRACT:

Modern manufacturing enterprise requires adaptable, trustable, and affordable solutions in model-based engineering and platform-based engineering. Limited or poor geometric interoperability of the software supporting engineering applications within the product life cycle now dominates practical considerations in deploying computational technologies and solutions.

I will argue that many computational problems in engineering may be formulated in a terms of standard geometric queries that are supported by any reasonable geometric representation, thus liberating engineering applications from assumptions of and dependence on any particular geometric system or representation. This in turn leads to solution procedures involving geometric and functional sampling and composition steps, used in conjunction with standard numerical techniques. I will demonstrate that systematic application of these principles yields practical computational solutions to two unrelated challenging problems: fully automated (in-situ) finite element analysis and rapid exploration of six-dimensional configuration space.

* Portions of this talk are based on joint work with Chris Hoffmann (Purdue) and Vijay Srinivasan (NIST)

**TUESDAY, AUGUST 28, 2012
ANDRUS GERONTOLOGY BLDG (GER) ROOM 309
3:30 – 5:00 PM**

Brief Bio



Vadim Shapiro is *Bernard A. and Frances M. Weideman Professor of Mechanical Engineering* and *Professor of Computer Sciences* at the University of Wisconsin – Madison, where he is a founding Director of the Spatial Automation Laboratory. He holds Bachelor degrees in Mathematics and in Computer Science from NYU, MS in Computer Science from UCLA, and MS and PhD degrees in Mechanical Engineering from Cornell University. Prior to his academic career he spent over ten years on research staff at the General Motors R&D Center. He teaches and conducts research in the areas of geometric modeling, computational geometry, engineering design and analysis, automation and interoperability, and product life-cycle management. His technical contributions have been recognized by a number of best paper awards, patents, fellowships, and NSF Career Award. He is a Fellow of ASME, Co-Editor in Chief of the *Computer-Aided Design* journal, and serves on editorial boards of several other archival journals.