Model-Driven Development and Search-Based Software Engineering:  
An Opportunity for Research Synergy

Lionel C. Briand  
Simula Research Lab & University of Oslo, Norway

There is a sharply increasing research activity in the area of model-driven development, in particular in  
the context of the OMG standard named Model-Driven Architecture (MDA), which is relying on the Unified  
Modeling Language (UML) and its extensions. The basic idea is to carry software development as a  
series of model transformations, going from requirements to a platform independent model, to a platform  
specific model, and then to code generation. Development is therefore model-centric and many activities,  
including early design analysis and test case generation, are based on models using UML or adequate  
extensions.

In many cases, while doing model analysis or test case generation, the goal is to identify worst-case  
scenarios from a certain viewpoint. For example, are deadlines (likely to be) missed? Are safety  
constraints (likely to be) violated? Such a problem can be re-expressed as a search problem and then  
addressed by evolutionary computing or other search heuristics. Though alternatives exist, for examples  
in the area of model checking, I believe that search-based approaches are more scalable and likely to  
provide realistic engineering solutions.

This keynote address will explain why there is a great opportunity for synergy between MDA and SBSE  
research. This will be illustrated by examples from recent research and industry collaborations.