

# Keynote

## Tackling Model-Based Software Testing and Verification as a Search Problem

Lionel C. Briand

Centre for Security, Reliability, and Trust (SnT)  
University of Luxembourg, Luxembourg

This talk reports on 10 years of research that approached model-based verification and testing as a search and optimisation problem. The techniques presented rely on system models describing the task architecture and performance characteristics. As a strategy to ease adoption in practice, those models rely on standards (e.g., UML/MARTE) or lightweight extensions enabling the use of commercial or open source modeling platforms to support automation. Once the required information is extracted from models, early verification and testing both consist in identifying scenarios that maximize chances of uncovering concurrency and performance issues, such as deadline misses, starvation, or unacceptable levels of CPU usage. To do so, we either rely on evolutionary computation or constraint optimization, for which effective support already exists. The main challenge is of course to transform each specific problem into a search or constraint optimization problem, in such a way that these technologies can be efficient and scale.

### Short Biography

**Lionel C. Briand** is professor and FNR PEARL chair in software verification and validation at the SnT centre for Security, Reliability, and Trust, University of Luxembourg. Lionel started his career as a software engineer in France (CS Communications Systems) and has conducted applied research in collaboration with industry for more than 20 years.

Until moving to Luxembourg in January 2012, he was heading the Certus center for software verification and validation at Simula Research Laboratory, where he was leading applied research projects in collaboration with industrial partners. Before that, he was on the faculty of the department of Systems and Computer Engineering, Carleton University, Ottawa, Canada, where he was full professor and held the Canada Research Chair (Tier I) in Software Quality Engineering. He has also been the software quality engineering department head at the Fraunhofer Institute for Experimental Software Engineering, Germany, and worked as a research scientist for the Software Engineering Laboratory, a consortium of the NASA Goddard Space Flight Center, CSC, and the University of Maryland, USA.