

# Bert Debusschere

## *Sandia National Laboratories*

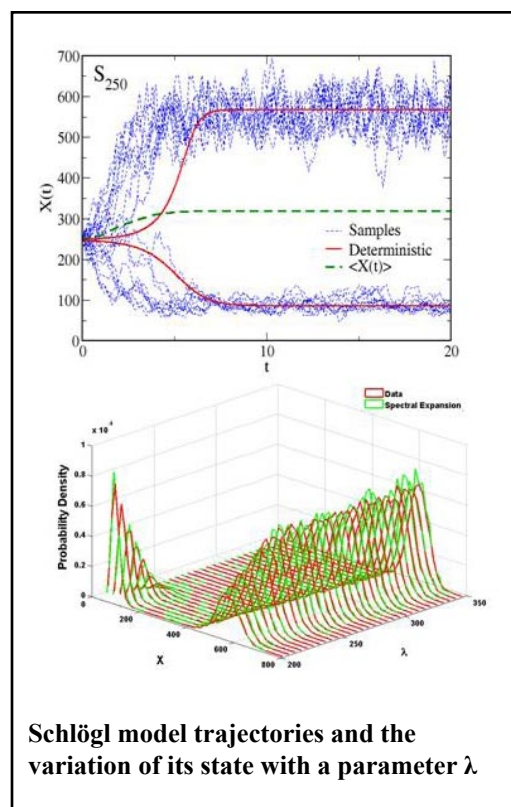


*For introducing rigorous, mathematical methods capturing stochastic uncertainties in computational biology and providing a framework for simulation-based discovery; and for service to the Sandia Diversity Council and Foreign National Networking Group.*

Bert Debusschere is a staff member in the Transportation Energy Center at Sandia National Laboratories, in Livermore, CA, where he currently develops computational methods for the study of chemical and biochemical reaction networks, with applications ranging from combustion to the human immune system. The goal is to gain a deeper understanding of the fundamentals of these reaction networks, to enable improvements in their energy efficiency and environmental footprint, or to facilitate novel biomedical approaches.

One of Dr. Debusschere's research projects focuses specifically on the analysis of stochastic reaction networks, which are prevalent in molecular level and biological systems, where the small numbers of molecules that participate in the reactions generate significant intrinsic noise in the system. Based on spectral representations of stochastic processes, Dr. Debusschere's research group has developed methods for sensitivity analysis, predictability studies, and reduced order modeling of stochastic reaction networks. These methods allow the analysis of these systems in terms of identifying their key properties, how they depend on the system parameters, and how reliably they can be predicted.

After receiving his Bachelor's degree in Mechanical Engineering from the Katholieke Universiteit Leuven in Belgium in 1994, Dr. Debusschere obtained a scholarship from the Belgian American Educational Foundation to pursue his Master's degree at the University of Wisconsin, Madison, where he obtained both his M.S. and Ph.D. degrees in Mechanical Engineering. In 2001, he joined Sandia National Laboratories in Livermore, CA, first as a postdoctoral researcher and later as a senior member of technical staff. At Sandia, Dr. Debusschere developed a broad research program in the areas of spectral uncertainty quantification, multiscale simulation, stochastic processes, and Bayesian analysis. He has also been very active fostering diversity at Sandia in his roles on the Division Diversity Council and the Foreign National Networking Group. When not at work, he assists in a non-profit canine rescue organization that he and his wife founded.



**Schlögl model trajectories and the variation of its state with a parameter  $\lambda$**