

THE INTERPLAY BETWEEN SIMULATION MODELS, STATISTICAL MODELS, AND DATA SYSTEMS

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ABSTRACT

Techniques for simulation modeling, statistical modeling (including machine learning), and data management have become increasingly intertwined, opening up rich possibilities for research and applications. We will survey a number of our research projects at the interface of these three areas. These include (i) use of data-integration techniques to create composite simulation models for complex systems-of-systems, (ii) use of machine learning to accelerate simulation-based optimization, and (iii) integrating simulations and information management systems to allow efficient simulation analysis close to the data. These projects also illustrate the many twists and turns of a professional career, and the importance of maintaining flexibility and curiosity.

SPEAKER BIOGRAPHY

PETER HAAS joined the UMass faculty as a Professor of Information and Computer Sciences and Adjunct Professor of Mechanical and Industrial Engineering in 2017 after 30 years at IBM Research — where he rose to Principal Research Staff Member — and 20 years as a Consulting Professor in Management Science and Engineering at Stanford University. His research lies at the interface of information management, applied probability, statistics, machine learning, and computer simulation. He is a Fellow of both ACM and INFORMS and has received awards from IBM and both the Simulation and Computer Science communities, including an IBM Research Outstanding Innovation Award, an ACM SIGMOD 10-year Best Paper Award for his work on sampling-based exploration of massive datasets, and the INFORMS Simulation Society Outstanding Publication Award for his 2002 Springer monograph on Stochastic Petri Nets. Current research topics include in-database decision support, machine learning (ML) for simulation, and predictive maintenance of ML models under data drift. He is the author of over 160 conference publications, journal articles, and books, and has been granted over 30 patents, leading to his designation as an IBM Master Inventor. His work has been incorporated into IBM products and, more recently, the Apache DataSketches library. His email address is phaas@cs.umass.edu.