

From the Desk of the Chair ...

Rick Severinghaus

It's nearing the end of 2016, and much has occurred in the domain we call M&S, with much more to come. In January, NMSC led a two-day workshop on the developing a common M&S research agenda. In March, NMSC held its annual leadership election and held its annual meeting in Chesapeake, VA, the day following the M&S Congressional Caucus Leadership Summit.

We have started planning for next year's annual meeting, which we will hold in the Detroit, MI area — *a first for us*. Our agenda will address business practices and how simulation tools, processes, and innovations drive improvements in manufacturing quality and efficiency. We will also address the challenges and opportunities creating robust collaboration and multi-disciplinary solutions to complex problems through application of computer simulation and modeling and its integration into systems engineering processes. Eric Weisel and Rick Darter are leading the planning effort; we are very glad to have their expertise, experience, and enthusiasm.

In early July, NMSC participated in the annual M&S Expo on the Hill, sponsored by NTSA. This public event, held in the Rayburn House Office Building, provided opportunity for Congressional Members and staff to view exhibits showcasing use of M&S and to talk with members of NTSA, NMSC, and others promoting the value and utility of simulation as an important component of addressing and solving today's broad expanse of challenging issues.

Heading into year's end, NMSC will have representation at the December 2016 Interservice/Industry Training, Simulation and Education Conference (I/ITSEC).

I am pleased to be representing the NMSC Policy Committee as Chair; my many thanks to Dr. Richard Fujimoto for his past service. I will endeavor to serve both NMSC and the larger M&S community well over the next few years. On our website, short descriptions of our elected leadership are provided. Please feel free to contact any of us. On behalf of NMSC, I look forward to working with all of you as we finish up the year's events and move into 2017's NMSC agenda.

Upcoming Events

28 Nov - 2 Dec 2016

I/ITSEC 2016, Orange County Convention Center, Orlando, FL

11-14 Dec 2016

2016 Winter Simulation Conference, Arlington, VA

28 Jan – 1 Feb 2017

International Meeting on Simulation in Healthcare, Orlando, FL

25-27 Apr 2017

MODSIM World 2017, Virginia Beach Convention Center, Virginia Beach, VA

Co-located with the

2017 Spring Simulation Multi-Conference

September 2017

NMSC National Meeting, Detroit, MI

Announcements

Policy Committee

Rick Severinghaus, Chair
 Randy Garrett, Vice Chair
 Steve Seay, Secretary
 Pamela J. Boyers
 Jesse Citizen
 C. Donald Combs, Ph.D.
 Rick Darter
 Richard Fujimoto
 Frederick E Hartman

Committee Chairs

Lisa Bair, COPA
 Eric Weisel, ID/BP
 Chuck Turnitsa, EPD
 Warren Bizub, Tech, R&D

Our Members Say ...

VMASC Executive Director, Dr. John Sokolowski, Authors Column on the Evolution of Modeling and Simulation in Hampton Roads

SIX YEARS AGO, when the Department of Defense announced that Joint Forces Command would be disestablished, many thought that move would spell the end of modeling and simulation in the region. However, this prediction has not come to pass. In fact, M&S has continued to grow and expand beyond the DoD and is now being used in new and different ways. Click here to read the full article: [Evolution of Modeling and Simulation in Hampton Roads](#).

Quantifying the Economic and Demographic Impact of Transportation Infrastructure Investments: A Simulation Study

A recently published article (April 2016) in SIMULATION by researchers at MIT, VMASC, and ODU examines how transportation infrastructure investments are a catalyst for regional economies, initiating population growth and stimulating commerce. These regional transportation investments are not constant overtime. Rather, they are cyclical. The resultant population growth and economic activity leads to congestion which, after delays due to governance and budget concerns, spur a new round of transportation investment. Click here to read the full article: [Quantifying the Economic and Demographic Impact of Transportation Infrastructure Investments: A Simulation Study](#).

Research Corner

Warren Bizub, Tech, R&D

I am assuming responsibility for the NMSC R&DC chair from Dr. Randy Garrett who has provided detailed background and an exemplar platform to continued success in our effort to move the common M&S research agenda forward, and Dr. Richard Fujimoto has helped tremendously during this transition.

M&S is challenged today by application requirements stemming from an increasingly complex and interconnected world in areas such as smart cities, cybersecurity, manufacturing, healthcare, autonomous systems, aerospace, etc. Emerging technology trends such as big data, cloud computing, the Internet of Things, and massively parallel supercomputers offer new opportunities for increased capability and impact of M&S technologies. During I/ITSEC 2016, the R&DC will host a M&S Common Research Agenda Panel of renowned industry and academia experts who will offer their views on the need for a common research agenda to address the most important challenges in the M&S field to enable focused future investments to maximize the impact of new M&S technologies. The impetus for this event was a workshop held in January 2016 at the headquarters of the National Science Foundation in Arlington, Virginia to work on the development of a common research agenda for the M&S community (see *Spotlight*). Our panel will provide brief position statements on engineering complex systems and processes in their field of expertise followed by audience participation through written questions. We look forward seeing you during this session at will provide a summary in future newsletters.

In the upcoming months the R&DC will focus our efforts on developing programs, aligning our emphasis and supporting requirements for the 2017 NMSC Annual Meeting in Detroit, Michigan and the projected 2018 NMSC National Meeting in Omaha, Nebraska. We anticipate taking the common research agenda golden nuggets from the workshop report and 2016 I/ITSEC panel and expanding our focus to identify details for a manufacturing M&S research agenda in Detroit, Michigan and healthcare M&S research agenda in Omaha, Nebraska. We look forward to the M&S R&D community working with us as we move to refine the common research agenda, capture details by sector and build consensus.

Spotlight ... National Science Foundation Workshop

Richard Fujimoto, Policy Committee

A two-day workshop was held on January 13-14, 2016 at the headquarters of the National Science Foundation in Arlington, Virginia to work on the development of a common research agenda for the M&S community. The workshop specifically focused on the role of M&S in engineering complex systems. Sponsored by the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the Air Force Office of Scientific Research (AFOSR) in addition to NMSC and its parent organization NTSA, the workshop drew 65 leading researchers from the modeling and simulation community who were selected from over 100 nominations resulting from an open call issued in 2015. The workshop was organized by a steering committee that included Richard Fujimoto (NMSC and Georgia Tech) who chaired the committee, Steven Cornford (NASA Jet Propulsion Laboratory), Christiaan Paredis (NSF), and Philomena Zimmerman (OSD).

The goal of the workshop was to identify and build consensus around critical research challenges in the M&S field related to the design of complex engineered systems—challenges and major problems facing society today with M&S solutions that could accelerate solving them significantly. Although modeling and simulation has been an active area of study for decades, new developments such as the need to model systems of unprecedented scale and complexity, the well-documented deluge in data, and revolutionary changes in underlying computing platforms are creating new opportunities and challenges in the M&S field motivated. This was the primary motivation for holding the workshop. It focused on four main technical themes: (1) conceptual models, (2) computational issues, (3) uncertainty quantification, and (4) reuse of models and simulations.

The workshop program included application-focused plenary presentations that discussed important areas where technical advances in M&S are critically needed: sustainable urban growth (John Crittenden, Georgia Tech), healthcare (Donald Combs, Eastern Virginia Medical School), manufacturing (Michael Yukish, Penn State University), aerospace (Steven Jenkins, Jet Propulsion Laboratory), and defense (Edward Kraft, U.S. Air Force).

In the M&S Community ...

CLOUDES: Advancing Computer Literacy and STEM Education

Computer literacy and STEM (Science, Technology, Engineering, and Math) education are at the forefront of modern educational initiatives. Both have the potential of enabling people, young and old, to become participants in a growing technological revolution, opening doors to entrepreneurship and rewarding employment opportunities. Computer literacy is considered crucial as reflected by efforts such as those of code.org and scratch.org. STEM education, on the other hand, has been and will continue to be a driving force behind innovation in ocean and space exploration, advanced manufacturing, robotics, biotechnology, and transportation to mention a few. M&S provides exposure to both areas. M&S teaches students how to capture a real or imaginary system in a computer and ask questions about that system. M&S helps develop the ability to 1) meaningfully simplify a complex problem; 2) capture the problem in a model; 3) describe the model in a computer language, 4) collect meaningful input data; 5) execute the model over time; 6) obtain and analyze results and 7) make inferences about a potential solution to the problem. M&S also exposes users to logic and statistics and develops problem solving and analytical skills. To support learning and practicing using and building simulations, VMASC developed CLOUDES, a web-based simulation environment where students can build, access, and share simulations. CLOUDES provides the non-expert and expert the capability of creating discrete-event simulations anywhere, anytime. It is an easy to use, online environment, accessible through mobile devices and requires no programming. Learn more here: <http://test.cloudes.me/>.

Spotlight ... (continued)

Break out groups in each of the four technical areas listed above were charged with discussing and identifying the four or five most important research challenges in that area that, if solved, would have the greatest impact. We documented the findings of these groups in a workshop report that we will publish soon online at our website.

The January workshop is one of a series of events organized by the NMSC Research and Development committee aimed at developing and building consensus around a common M&S research agenda. Activities leading up to the workshop included presentations and panel sessions at the Winter Simulation Conference, Modsim World Conference, Simultech, and the Simulation Interoperability Workshop in addition to the NMSC National Meeting. Follow up activities organized by NMSC subsequent to workshop included presentations and panel discussions at the 2016 M&S Congressional Caucus Leadership Summit, a panel session at the 2016 ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (SIGSIM-PADS), and a planned panel session at the 2016 Interservice/Industry Training, Simulation and Education Conference (I/ITSEC) to take place later this year.

From the Editor...

Lisa Jean Bair, COPA


I hope that you have enjoyed reading our inaugural NMSC Newsletter. This was the primary goal for the COPA committee this year, and I am proud to have the privilege to be the first editor of this newsletter. We plan to publish newsletters quarterly. I hope that this newsletter will help to grow our community, share ideas, promote new research, and strengthen our community of practice. Future issues will include features from all of our committees. Look for new information affecting the discipline and practice of M&S—*from business and industry to education and theory*. We also will include upcoming M&S events, new publications, and other items of interest to the M&S Community. We hope to spotlight thoughts from decision makers, leaders in the M&S community, and leaders in industry who use or would benefit from M&S—*from defense and manufacturing to energy and health care*. If you have something you'd like to share with our broader M&S community or would like to author a *Spotlight* piece, please contact me. I look forward to our Winter issue. I am looking for a deputy editor. If you are interested, please let me know.

How You Can Help

Growing our NMSC is the work of more than our Policy and Standing Committees. Our community of practice, communicating with leaders in industry and government, makes us relevant and will help us grow. We thank everyone who comes to our meetings and helps with the committees, but we cannot do it alone. If you'd like to help contact a committee member. We are looking for deputy chairs and committee members.

Thank you for your support and help.

<http://www.thenmsc.org>



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