

GRAND CHALLENGES IN HEALTHCARE MODELING AND SIMULATION: A PANEL DISCUSSION

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ABSTRACT

Since the start of the COVID-19 pandemic the importance of healthcare to all aspects of society has become much more obvious. Simulation modeling, particularly of infectious diseases has also become more accepted by the general population and decision makers. The challenges within healthcare systems are more pronounced, not simply due to COVID-19 but also due to other societal factors such as the ageing populations in Europe, North America and parts of Asia. Our aim is to take a global view, and we will run a panel discussion at the conference drawing on expertise from across the world and from different areas of healthcare to identify the grand challenges that researchers working in healthcare simulation should address over the next ten years.

1 INTRODUCTION

The aim of the Grand Challenges session is to generate debate between modelers working in healthcare simulation as to the big unanswered questions in the area. These can then be used as a large-scale roadmap showing how healthcare simulation may develop over the next decade. As a community, we have returned to grand challenges in simulation around once per decade with the original Workshop on Grand Challenges for Modeling & Simulation (M&S), held at Dagstuhl in Germany in 2002 (Dagstuhl 2002), organized by Richard Fujimoto, W. H. Lunceford, Jr., Ernest H. Page and Adelinde M. Uhrmacher. A subsequent panel

session was run at the Winter Simulation Conference in 2012 (Taylor et al. 2012) with similar panels at SpringSim and the first SIGSIM-PADS conference, both in 2013. The results of these panel discussions are summarised in Taylor et al. (2013). In this decade we are looking at different areas of M&S separately, ultimately collating the grand challenges in a series of papers in the Journal of Simulation.

2 HEALTHCARE SIMULATION

Ten years ago in (Taylor et al. 2013), Sally Brailsford suggested that the key challenge for healthcare modeling was around implementation, raising the question: “Is it possible to build a generic model, or a suite of generic building blocks, which are software-platform independent, and easily understood by clinical and managerial stakeholders in healthcare systems, and which would enable hospital simulations to be built rapidly and re-used, and would lead to wide uptake and acceptance of simulation models? Could simulation models ever be as pervasive as spreadsheets in healthcare organizations?” The panel will begin with a discussion of whether this aim has been reached touching on the Open Science debate with an initial question:

- How can (healthcare) M&S researchers best share their computational work and models?

Grand challenges in healthcare simulation form around both the modeling methods and the applications likely to predominate over the next decade. Below we list the starter questions that will be raised during the session. Both panel members and the audience will be asked to contribute to the discussions.

- How do you see healthcare changing over the next decade and what challenges does this raise for M&S?
- What technical advances are needed in modeling and simulation to enable better support for decision makers?
- Are you able to identify a key priority for health care M&S researchers?
- Which other disciplines should we engage with to ensure that our models are answering the challenging questions and are accepted by healthcare managers and practitioners?

We hope that the panel will provide us with a set of open questions and challenges for the healthcare M&S community to take forward over the next ten years.

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