

# Call for Papers

## **SIMULATION: Transactions of the Society for Modeling and Simulation International**

### **Modeling & Simulation with Data Science**

#### **Introduction**

As modeling & simulations always have been the beneficiary of data, the coming of data science opens new opportunities to improve all aspects in the theory and the applications of modeling and simulation. Here, the data science is different from the casual idiom of “big data” since the science has a disciplined approach in handling, modeling and analyzing data with the rigorous manner. This scientific rigor opens the new opportunities in formulating problems in modeling and simulation with data, and this scientific rigor asks the modeling and simulation field to improve its current practice on handling the input, the output, and the parameter data for models.

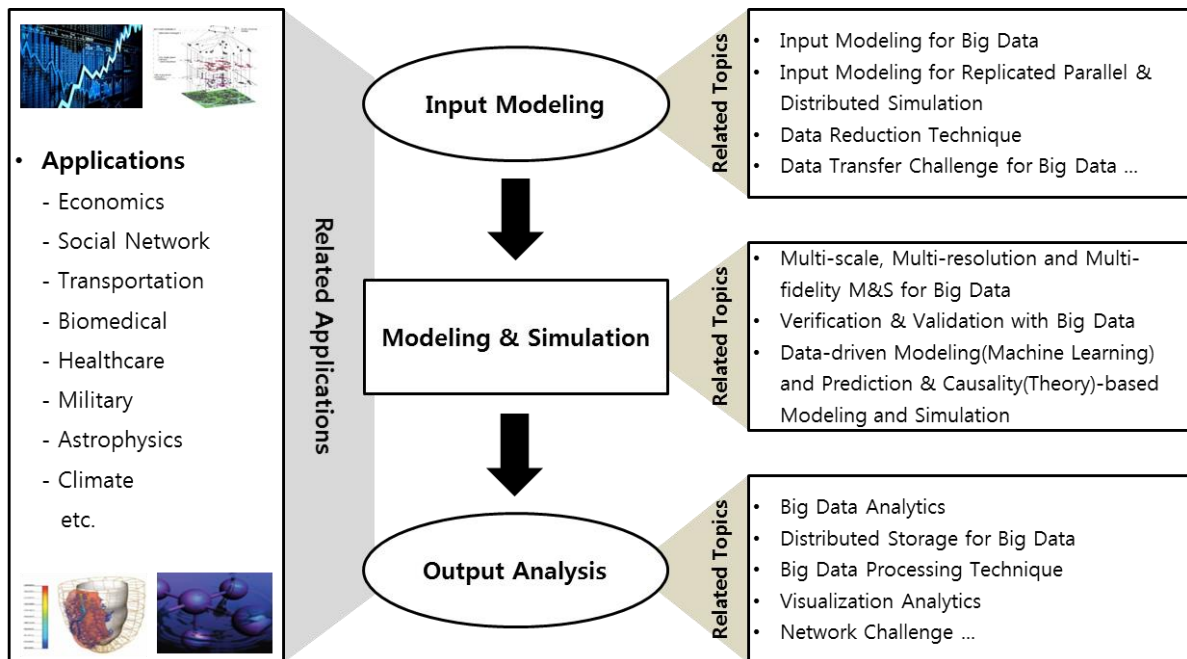
The theoretic aspects of modeling simulation includes the input modeling, the modeling methodology, and the output analysis from a large perspective. These stages of modeling and simulation typically used data in identifying the input distribution, calibrating models with grounded parameters, and data-farming on the massive simulation results with many executions from large virtual experimental designs. However, as the science and the engineering on data introduces new theories and technologies, modeling and simulation would adopt the new methodologies from machine learning, statistical data-mining, massive data visualization, parallel and distributed computing with Yarn and Hadoop, large scale data-management, etc. Just like the theoretic aspects, it is possible to expand the applications of modeling and simulation in terms of the diversity of domains and the depth of utilization. The data science enables modelers to utilize real world parameters in their simulations as well as to validate the models with historic data, so the models can be closer to the real world with the support of the large-scale data. Additionally, the collection of large-scale data from various domains, which were not well-known to the simulation community, let the community apply the modeling and simulation to such domains, i.e. astrophysics domains and biomedical domains.

Noticing these new opportunities in adopting the benefits of the data science, this special issue is devoted to present new ideas, theories, technologies, and case studies, which are enabled by the merge of modeling and simulation; and theories and technologies leading the modeling and simulation community to embrace the potentials of the data science. All manuscripts submitted to this special issue show the rigorous handling, modeling and analysis of data in the modeling and simulation field, and it would be preferable to handle a large-scale data because it is more challenging to keep the rigor as the data size grows.

Topics of interests include the following, but are not limited to the below. Also, contributions are encouraged to exhibit their innovation in multiple aspects of the below.

- Theories
  - Innovations on input modeling: input modeling with data science, input modeling for replicated parallel and distributed simulation, data dimensionality reduction, data transfer between domains
  - Innovations on modeling methodologies: multi-scale, multi-resolution and multi-fidelity modeling and simulation for and with data science, verification and validation with data science, data-driven modeling and prediction-based modeling and simulation including machine learning techniques
  - Innovations on output analysis: data analytics, distributed storage for large scale data, analytic processing on large scale data, simulation visualizations with large scale data
- Applications

- Any domain with data science applications: Economics, social media, transportation, biomedical, health care, military, astrophysics, climate, etc



Submissions should be original work with scientific contributions, and can neither have been published nor be under concurrent review of another journal or conference. All submitted papers should be written in English and follow the format standards of the Journal. Each paper will be subjected to the Journal's usual peer review process. Once a manuscript has been accepted for publication, it will undergo language copyediting, typesetting, and reference validation in order to provide the highest publication quality possible.

## Due Dates

Submission deadline	April 30, 2016
First author notification	July 30, 2016
Revised version	September 30, 2016
Final notification	October 30, 2016

## Guest Editors

- **Il-Chul Moon**  
 Department of Industrial and Systems Engineering  
 KAIST  
 Republic of Korea  
[icmoon@kaist.ac.kr](mailto:icmoon@kaist.ac.kr)