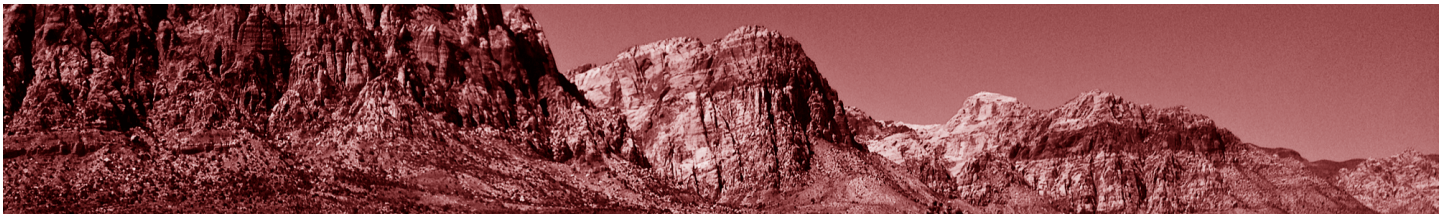

# TRACKS

Advanced Tutorials
Agent-Based Simulation
Analysis Methodology
Architecture and Construction
Aviation Modeling and Analysis
Case Studies
Cyber-Physical Systems
Environment and Sustainability Applications
Future of Simulation

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Logistics, SCM, Transportation
Modeling and Analysis of Semiconductor Manufacturing (MASM)
Military Applications and Homeland Security

Modeling and Simulation of Intelligent, Adaptive and Autonomous Systems (MSIAAS)
Modeling Methodology
Poster
Project Management
Simulation Education
Simulation Optimization
Social and Behavioral Simulation
Vendor

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## Advanced Tutorials

**Track Coordinator:** Philip A. Wilsey, University of Cincinnati

The Advanced Tutorials track is oriented toward more experienced practitioners and researchers who do not necessarily specialize in simulation research, but nevertheless seek the latest modeling and analysis tools and techniques for advanced applications. Special-focus sessions within the Advanced Tutorials Track

give practitioners and researchers a survey of recent fundamental advances in the theory of simulation modeling and analysis.

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## Agent-Based Simulation

**Track Coordinators:** Ashkan Negahban, Penn State University and Levent Yilmaz, Auburn University

The Agent-Based Simulation (ABS) track is interested in theoretical, methodological and applied research that involves synergistic interaction between simulation and agent technologies. Contributions to the ABS track are expected to use agent-based models of complex adaptive systems and self-organizing emergent phenomena with applications to fields such as biomedical sciences, business, engineering, environment, individual, group, organizational behavior, social systems and intelligent transportation systems. Also, of interest are contributions that demonstrate the use of agents as support facilities to enable computer assistance in simulation-based problem solving (i.e., agent-supported simulation), or the use of agents for the generation of model behavior in a simulation study. Topics include, but are not limited to, the following:

**Applications:**

- Autonomous and adaptive systems
- Complex adaptive systems modeling
- Self-organizing systems
- Simulation modeling of agent technologies at the organization, interaction (e.g., communication, negotiation, coordination, collaboration) and agent level (e.g., deliberation, social agents, computational autonomy)

**Technology, Tools, Toolkits and Environments:**

- Agent infrastructures and supporting technologies (e.g., interoperability, agent-oriented simulation software engineering environments)
- Agent architectures, platforms, and frameworks
- Standard APIs for agent simulation programming

**Theory and Methodologies:**

- High-level agent specification languages for modeling and simulation
- Distributed simulation for multi-agent systems
- Formal models of agents and agent societies
- Verification, validation, testing; quality assurance; as well as failure avoidance in agent-based simulations
- Advanced agent features for agent-directed simulation: e.g., agent-based simulation to monitor multi-simulation studies, agents in design and monitoring of simulation experiments and analysis of results

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## Analysis Methodology

**Track Coordinator:** James Thompson, MITRE

The Analysis Methodology track is intended to cover a variety of empirical, computational, mathematical and statistical techniques in the context of their application to simulations. Papers covering the construction and calibration of simulation inputs that either improve upon standard approaches or introduce new methods are encouraged. Similarly papers covering the analysis of simulation output that aims to meaningfully interpret the information produced by simulations and allows modelers to make useful inferences regarding the simulated system are also included. Finally, papers that deal with the efficiency, accuracy and appropriateness of a simulation as a representative model of some actual system are also covered by the Analysis Methodology track. The main focus of this track is to explore methods for obtaining better inputs, estimates or inferences using practical or novel approaches. We also welcome suggestions for sessions on emerging topics. Nonconventional methods, methods dealing with non-stationary time series, and methods for dealing with nonlinear dynamics are welcome.

Topics of interest include, but are not limited to, the following:

- Simulation of financial processes
- Constructing and calibrating non-stationary inputs
- Delay-coordinate embedding
- Random variate and process generation
- Variance reduction
- Rare-event simulation
- Sensitivity analysis

- Markov chain Monte Carlo methods
- Analytic representations of simulation models
- Metamodeling

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## Architecture and Construction

**Track Coordinators:** Amin Hammad, Concordia University (CA) and Cheng Zhang, Xi'an Jiaotong-Liverpool University (CN)

The Architecture and Construction track includes innovative research as well as practical application papers that apply computer simulation to complex architectural and construction management problems. Topics include, but are not limited to, the following:

- Simulation approaches: discrete event simulation, system dynamics, agent-based simulation, Monte Carlo simulation, hybrid simulation, etc.
- Applications and case studies in construction, such as: modularization, human and organizational behavior, sustainable built environment, net zero energy buildings, project planning and control, lean production management, productivity and safety studies using simulation, simulation-based optimization.
- Applications and case studies in architecture, such as: simulation and visualization in architectural design, building envelop, light and sound simulation, etc.
- Simulation and visualization of construction processes with Building Information Modeling (BIM), BIM-based collaboration, n-D modelling, virtual and augmented reality (VR/AR).
- Distributed and parallel simulation
- Coupling simulation with sensory data
- Simulation as educational tool

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## Aviation Modeling and Analysis

**Track Coordinators:** Joe Hoffman, MITRE, Miguel Mujica Mota, HVA – Amsterdam University of Applied Sciences (NL), and Umut Durak, German Aerospace Center (DLR) (GE)

The world's air transportation system is preparing for an influx of new users with diverse needs, while simultaneously growing in its traditional areas. The Aviation Track aims to cover most of the important areas of the aviation industry where simulation can provide solutions. Therefore, we invite researchers from research institutions, universities, airlines, air navigation service providers, and industry to submit original papers presenting results of their work.

Areas of interest are, but not limited to:

- Human-in-the-Loop simulations for training and for evaluating new technologies
- Airports
- Capacity & efficiency improvement
- Airport capacity forecast
- Business intelligence for airports
- Multi-Airport Systems
- Small and regional airport development
- Airline operations
- Maintenance, Repair, and Overhaul and Lean MRO
- Optimization of processes in aviation
- Air Traffic Management
- ATC/AIRPORT systems
- Predictability of air transportation operations
- Unmanned airborne systems
- Trajectory modeling
- Safety of interactions with manned aviation
- Air traffic control concepts
- Development of incident investigation
- Environmental effects of aviation
- Economics of the air transportation system

- Communications, Navigation, and Surveillance systems

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## Case Studies

**Track Coordinator:** Gordon Guodong Shao, NIST

The Case Studies Track serves as a multidisciplinary forum for professionals to share what they have learned modeling real world problems using simulation. The applications are open to all areas including, but not limited to:

- Manufacturing
- Logistics and distribution
- Healthcare
- Mining
- Social and human behavior
- Aerospace
- Food services
- Military
- Data analytics
- Standard implementations

The track will consist of 30-minute presentations, which should include time for questions and answers. The presentations should focus on a specific problem where simulation was utilized to conduct an analysis and provide recommendations for potential solutions. A two-page extended abstract is required to be submitted for consideration via the WSC submission site. No full length paper is required. The extended abstract should, at a minimum, describe the problem, the simulation methods used, the results, and the impact/benefits of the project. A separate shorter version of the abstract limited to 150 words must also be submitted. The abstracts will be reviewed and those case studies selected for presentation at WSC will have their abstract appear in the final program of WSC and on the WSC Archive website to share what they have learned modeling real world problems. If you are interested in having a relevant panel session in the case study track, a two-page extended abstract that described the panel needs to be submitted. A 90- mins panel slot will be allocated to those whose panel proposals have been accepted. Online submission for the Case Studies Track will open in June 2017. Case Study track papers should use the standard template for submission, and submit papers 2 pages long only.

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## Cyber-Physical Systems

**Track Coordinators:** José Luis Risco-Martín, Complutense University of Madrid (SP) and Akshay Rajhans, MathWorks

Cyber Physical Systems (CPS) are complex engineered systems whose operations are controlled, coordinated, monitored, and integrated by computer-based algorithms. Examples of CPS include smart grids, autonomous automotive and avionics systems, medical monitoring and control, process control systems, robotic systems, and automatic pilot avionics. This computing power is embedded in the physical environment of a wide variety of objects and structures, and is interconnected using networks. Such tightly coupled computations and communication capabilities allow CPS to augment with physical processes with new capabilities. With the advent of low-cost programmable internet-ready hardware, CPS are rapidly becoming internet-connected. Such an Internet of Things (IoT) opens new possibilities for collecting, managing and processing large data sets to manage and control such systems at different temporal, physical, and geographical scales. Advances in the CPS and IoT domains are having great economic, social and technical impacts. Therefore, there is an emerging consensus that new methodologies and tools are needed for developing such systems.

**Topics of interest include, but are not limited to:**

- Modeling and simulation of CPS
- Multi-domain and multi-formalism modeling and analysis of CPS
- Distributed and cloud computing for the design and analysis of complex CPS
- Design automation tools and tool chains for model-based design of CPS
- Design of networking systems for CPS
- Control of (networked) CPS
- Simulation-guided formal verification of safety-critical CPS
- Resilient and robust system design of CPS and IoT
- Security and privacy of CPS and IoT
- Ubiquitous and pervasive computing for enhanced user interactions with CPS and IoT

- Wearable and biomedical CPS

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## Environment and Sustainability Applications

**Track Coordinators:** Josep Casanovas, Polytechnic University of Catalonia (SP), Pau Fonseca, Polytechnic University of Catalonia (SP), and Alessandro Pellegrini, University of Rome “La Sapienza” (IT)

The Environmental and Sustainability Applications track focuses on the use of modeling and simulation for the analysis of the environment, of coupled natural-human systems, and of resilient and sustainable solutions to environmental and natural resource challenges. Application areas include ecological systems, natural disasters, renewable resources, sustainable manufacturing, sustainable infrastructure, urban planning, sustainable architecture and human-environment interaction. We solicit papers presenting new ideas, concepts, models, methods, tools, standards, and applications pertaining to the evaluation and preservation of the natural environment and its resources.

Possible topics include, but are not limited to, the modeling, simulation, and analysis of:

• Human-environment interaction

• Ecological systems

• Resilience in coupled natural-human systems

• Natural disasters and their impact on society

• Renewable resources and related processes

• Human adaptation to climate change

• Sustainable power grids/smart grids

• Energy efficient and sustainable urban planning and design

• Sustainable infrastructure, architecture, NZEB

• Energy/resource efficient manufacturing

• Environmental modeling, visualization, and optimization

• Decision support and analytics for sustainability

• Information modeling and interoperability for sustainability applications

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## Future of Simulation

**Track Coordinators:** Dong (Kevin) Jin, Illinois Institute of Technology, Eduardo Pérez, Texas State University, and Esteban Mocskos, University of Buenos Aires (AR)

The future of simulation track welcome speakers active of the fields related with simulation.

The goal of this track is to think, imagine, trace and describe our dynamic field in terms of the discipline for the next 50 years.

We look forward leading scholars and practitioners doing cutting edge research in techniques, tools, methods and technologies of the application and use of discrete-event simulation, agent-based modelling, systems dynamics and hybrids of these approaches.

This special track was developed to commemorate the 50th anniversary of the Winter Simulation Conference and is focused on the topics our discipline will have to deal during the next years.

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## Gaming

**Track Coordinator:** Osman Balci, Virginia Tech

The Gaming track deals with the intersection of games and simulation in many fields such as education, business, management, entertainment, training, military, and medical sciences.

Topics include, but are not limited to, the following:

- Enhancing engagement and motivation for learning using simulation-based gaming
- Game architecture for online game-based learning
- Game design approaches, methodologies, and techniques (prototyping, playtesting, evaluation, risk analysis)
- Game development approaches, methodologies, and techniques
- Game environments for informal or formal learning
- Game environments for training
- Game idea generation strategies
- Game quality evaluation
- Game requirements development
- Game-based learning assessment
- Game-based learning quality indicators
- Methodology, analysis, and design of game-based simulations
- Multi-agent or behavioral simulation in game environments
- Multiplayer online digital educational games

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## Healthcare Applications

**Track Coordinators:** Miguel Mujica Mota, HVA – Amsterdam University of Applied Sciences (NL) and Edward Williams, University of Michigan

The Healthcare Applications track addresses an important area in which simulation can provide critical decision support for operational and strategic planning and decision making that individual providers (doctors/nurses, clinics, urgent care centers, hospitals) face, as well as for policy issues that must be addressed by administering systems (e.g., hospitals, insurance companies and governments). Traditionally, this track has been broad in focus, incorporating Discrete Event Simulation, System Dynamics, Agent-Based Simulation, and/or Monte Carlo simulations, with a variety of applications. A common thread is the use of simulation tools to provide insight into or to inform decisions for improved healthcare outcomes. New modelling tools that address challenges with the conceptualization or implementation of healthcare systems, and general healthcare simulations are welcome.

Topics include, but are not limited to, the following:

- Admissions and control
- Ancillary services
- Appointment scheduling
- Emergency room access
- Epidemic modelling
- General healthcare simulation
- Global Health
- Healthcare optimization
- Healthcare systems
- Medical decision making
- Outpatient access
- Outpatient capacity analysis
- Payment/Payer models
- Performance improvement models
- Pricing models
- Resource scheduling (e.g., nurse, doctor, anesthesiologist, residents, equipment, etc.)

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## History of Simulation

**Track Coordinator:** Robert G. Sargent, Syracuse University

The papers in this track cover the history of simulation. Note that these are history papers and not survey or tutorial papers. The history papers may include relevant personal experiences. Areas of interest include:

- The history of the use of simulation in an application area.
- Significant historical events or activities in simulation.
- The history of simulation interactions with another field.
- The history of the use of simulation in a specific country (excluding the USA and United Kingdom).
- For history of a simulation methodology topic, please contact the Track Coordinator prior to writing your paper due to the fact that the track has several invited papers.

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## Hybrid Simulation

**Track Coordinator:** Navonil Mustafee, Exeter University (UK), Sally Brailsford, University of Southampton (UK), and Tillal Eldabi, Brunel University (UK)

Simulation methods enable stakeholders to analyze and evaluate strategies for effective management of complex systems. It is therefore not surprising that an increasing number of studies have used techniques such as discrete-event simulation, Monte Carlo simulation, system dynamics, Markov chain and agent-based simulation to make better and more informed decisions. However, such techniques have frequently been applied in isolation. The complexity of systems and their multi-faceted relationships may mean that the combined application of simulation methods, or hybrid simulation, will enable synergies across techniques and will provide greater insights to problem solving. The aim of this track is therefore to solicit papers that focus on combining techniques (e.g., discrete and continuous). In particular, the papers must demonstrate the need for hybrid simulation and how this approach could be used for modeling and simulating complex systems.

Topics include, but are not limited to, the following:

- Synthesis of existing literature in hybrid simulation and Bibliometric analysis
- Methodology, e.g., papers presenting the conceptualization of hybrid simulation through use of frameworks and modelling formalisms
- Technical papers focussing on development of software artefacts for facilitating hybrid simulation, e.g., parallel and distributed simulation
- Case studies that have applied hybrid simulation in domains such as manufacturing, logistics and supply chain, healthcare
- Papers focusing on continuous simulation/systems dynamics that incorporate discrete elements
- Combined application of modelling and simulation with other well-defined OR techniques (including soft OR)
- Classification of mixed method simulation

The track coordinators also encourage papers on Hybrid Systems Modelling, which is the **combined application of simulation methods with the wider modelling techniques that are frequently used in Operational Research (OR),** for example, papers that have applied DES and game theory, ABS with metaheuristics, SD papers that have used soft Operational Research methods like problem structuring, simulation papers that have delved into statistical techniques associated with data-mining and predictive analytics.

The track will be organised into specific themes, for example:

- Methodological aspects of Hybrid Simulation
- Modeling human behavior using Hybrid Simulation
- Hybrid Simulation for healthcare planning
- Hybrid Simulation for planning and scheduling
- Hybrid Simulation for sustainable operations management
- Hybrid Systems Modelling – Combined application of Hybrid Simulation with wider OR techniques

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## Introductory Tutorials

**Track Coordinator:** Simon J E Taylor and Anastasia Anagnostou, Brunel University London (UK)

The Introductory Tutorials track is oriented toward professionals in modeling and simulation interested in broadening or refreshing their knowledge of the field. Tutorials cover all areas including mathematical and statistical foundations, methods, application areas and software tools.

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## Logistics, Supply Chain Modeling, Transportation

**Track Coordinators:** Markus Rabe, Technical University of Dortmund and David Goldsman, Georgia Institute of Technology

The nature of highly dynamic and complex networks of supply, intralogistics, and distribution leads to decreasing transparency at increasing risk. Therefore, managers who are responsible for supply chain management and logistics require effective tools to provide credible analysis in this dynamic environment. In order

to facilitate the discussion of the best applications of simulation in this area, this track includes papers in logistics simulation, supply chain simulation, and simulation for planning, analyzing, and improving logistics from the intralogistics view to global supply chains.

Topics of interest include, but are not limited to, the following:

- Supply chain design
- Supply chain responsiveness
- Supply chain risk analysis
- Statistical analysis of supply chains
- Simulation-based optimization of supply chains
- Lean supply chains
- Supply chain operations
- Demand and order fulfillment
- Inventory policies
- Multi-modal logistics systems
- Port operations
- Rail operations
- Traffic and routing
- Intralogistics
- Advanced material flow systems

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## Manufacturing Applications

**Track Coordinator:** Sanjay Jain, George Washington University and Cristoph Laroque, WH Zwickau (GE)

Simulation is a well-established model-based methodology for analyzing dynamics and inter-dependencies in manufacturing systems. The Manufacturing Applications track is interested in research using simulation in industrial applications such as automotive, aircraft, shipbuilding, and consumer products manufacturing. Manufacturing applications relate to the model-based analysis of (i) all production and logistics processes within a manufacturing enterprise, (ii) across the hierarchical levels of factory, line, cell, workstation, machine and process, and (iii) across all phases of a system life cycle, such as system acquisition, system design and planning, implementation, start of operation, ramp-up, as well as the operation itself. A contribution shall describe the aims of investigation, the investigated system, the simulation model and its verification and validation, the experimental plan, the findings and any implementation results.

Topics include, but are not limited to, the following:

- Manufacturing system design and operations
- Applications of simulation-based optimization in production
- Cyber-physical systems, Industrial Internet, Industry 4.0
- Virtual Factory, Digital Factory
- Production planning and scheduling
- Lean manufacturing, Total quality management
- Maintenance and Lifecycle-Assessment
- Integration of energy and carbon footprint considerations

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## Modeling and Analysis of Semiconductor Manufacturing (MASM)

**Track Coordinators:** John W. Fowler, Arizona State University; Lars Monch, University of Hagen and Youin Choung, Samsung

Click here for more information about MASM.

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## Military Applications and Homeland Security

**Track Coordinators:** Ray Hill, AFIT, Subhashini Ganapathy, Wright University, and Julia Phillips, Argonne National Lab

The Military, Homeland Security and Emergency Response Applications track is interested in papers that describe the application of simulation methods to problems in the military, homeland security, and emergency response. Applications may be in any area related to military such as battlefield simulation, military logistics/transport, military man power planning, unmanned systems, etc. For homeland and emergency response applications are sought in the protection of critical infrastructure, transportation security, bio-defense, and the phases of the emergency response lifecycle, i.e., preparation/training, response, recovery and mitigation, etc. Simulation applications that illustrate the relationships between the military and homeland security and emergency response are especially welcome.

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## Modeling and Simulation of Intelligent, Adaptive and Autonomous Systems (MSIAAS)

**Track Coordinators:** Saurabh Mittal, MITRE Corporation, Jose L. Risco Martin, Complutense University of Madrid, Spain, Marco Lutzenberger, DAI-Lab, TU Berlin, Germany, and Claudia Szabo, University of Adelaide, Australia

The increasing popularity of the Internet of Things, or IoT metaphor emphasizes that heterogeneous systems are the norm today. A system deployed in a netcentric environment eventually becomes a part of a system of systems (SoS). This SoS also incorporates adaptive and autonomous elements (such as systems that have different levels of autonomy and situated behavior). This makes design, analysis and testing for the system-at-hand a complex endeavor in itself.

Testing in isolation is not the same as a real-system operation, since the system's behavior is also determined by the input, which evolves from the environment. This exact factor is difficult to predict, due to an ever-increasing level of autonomy. Advanced Modeling and Simulation (M&S) frameworks are required in order to facilitate SoS design, development, testing, and integration. In more particular, these frameworks have to provide methods to deal with intelligent, emergent, and adaptive behavior as well as autonomy.

The subject of emergent behavior and M&S of emergent behaviors takes the center stage in such systems as it is unknown how a particular system responds in the face of emergent behavior arising out of interactions with other complex systems. Intelligent behavior is also defined as an emergent property in some complex systems. Consequently, systems that respond and adapt to such behaviors may be called intelligent systems as well.

This track has two objectives.

**The first objective** aims to focus on M&S of the following aspects of complex SoS engineering and brings researchers, developers and industry practitioners working in the areas of complex, adaptive and autonomous SoS engineering that may incorporate human as an integral part of SoS operations. This objective covers the following topics:

- Theory for adaptive and autonomous systems
- Intelligence-based systems
- Computational intelligence and cognitive systems
- Human-in-the-loop systems
- M&S Frameworks for intelligent behavior
- Methodologies, tools, and architectures for adaptive control systems
- Knowledge engineering, generation and management in IAAS
- Weak and Strong emergent behavior, Emergent Engineering
- Complex adaptive systems engineering
- Self-* (organization, explanation, configuration) capability and collaborative behavior in IAAS
- Applications to robotics, unmanned vehicles systems, swarm technology, semantic web technology, and multi-agent systems
- Netcentric IAAS
- Live, Virtual and Constructive (LVC) environments
- Simulator design for IAAS systems
- Modeling tools for IAAS design
- Modeling, engineering, testing and verification of complex behavior
- Development and testing of complex and distributedsystems
- Modeling, simulating, and testing IoT environments and applications

**The second objective** is to advance the science of complexity as applicable in M&S discipline. Complexity is a multi-level phenomenon that exists at structural, behavioral and knowledge levels in such SoS. Emergent behavior is an outcome of this complexity. Understanding emergent behavior as an outcome of this complexity will provide foundation for resilient intelligent systems. Following are some of the topics related to this objective, but not limited to:

- Complexity in Structure: network, hierarchical, small-world, flat, etc.
- Complexity in Behavior: Micro and macro behaviors, local and global behaviors, teleologic and epistemological behaviors
- Complexity in Knowledge: ontology design, ontology-driven modeling, ontology-evaluation, ontology transformation, etc.

- Complexity in Human-in-the-loop: artificial agents, cognitive agents, multi-agents, man-in-loop, human-computer-interaction
- Complexity in intelligence-based systems: Situated behavior, knowledge-based behavior, memoic behavior, resource-constrained systems, energy-aware systems
- Complexity in adaptation and autonomy
- Complexity in architecture: Flat, full-mesh, hierarchical, adaptive, swarm, transformative
- Complexity in awareness: Self-* (organization, explanation, configuration)
- Complexity in interactions: collaboration, negotiation, greedy, rule-based, environment-based, etc.
- Complexity in Live, Virtual and Constructive environment
- Complexity in Artificial Systems, Social systems, techno-economic-social systems
- Complexity in Model Engineering of complex SoS
- Complexity in Model Specification using modeling languages and architecture frameworks such as UML, PetriNets, SysML, DoDAF, MoDAF, etc.
- Complexity in Simulation environment engineering: distributed simulation, parallel simulation, cloud simulation, netcentric parallel distributed environments
- Complexity in Testing and Evaluation tools for SoS engineering
- Complexity in Heterogeneity: Hardware/Software Co-design, Hardware in the Loop, Cyber Physical Systems, the Internet of Things
- Metrics for Complexity design and evaluation
- Verification, validation and accreditation of Complexity in SoS
- Application of Complexity aspects in domain engineering: Financial, Power, Robotics, Swarm, Economic, Policy, etc.
- SoS Failure due to Complexity

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## Modeling Methodology

**Track Coordinators:** Fernando Barros, University of Coimbra (PT), Umut Durak, German Aerospace Center (DLR) (GE), and Jason Liu, Florida International University

The Modeling Methodology track is interested in methodological advances with respect to the theory and practice of modeling and simulation. These may include approaches to formal model development, data capture, model building, verification, validation, experimentation, and optimization. New modeling and simulation formalisms and extensions to current formalisms are welcome. Of special interest are formalisms able to integrate models described in different paradigms. Contributions to the advancement of the technology and the software used to support modeling are also welcome as are contributions featuring guiding or unifying frameworks, the development and application of formal methods, and lessons learned. If you have a proposal for a special session or a panel discussion of particular interest to the WSC participants, please send an email with a short description and references to related work to track chairs. Topics of interest include, but are not limited to, the following:

- Modeling and simulation formalisms
- Metamodeling and model transformations
- Multilevel modeling
- Multi-resolution modeling
- Multi-paradigm modeling
- Modeling approaches for real-time systems
- Modeling approaches for spatially distributed systems
- Model reuse, repositories and retrieval
- Parallel and distributed simulation
- Semantic tools supporting modeling methods
- Standardization challenges
- Modeling for augmented reality
- Enhancing the impact of modeling and simulation
- Grand challenges for modeling and simulation
- Reproducibility of simulation experiments

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## Poster

**Track Coordinators:** Mohammad Moallemi, Embry-Riddle Aeronautical University, Shafagh Jafer, Embry-Riddle Aeronautical University, and Joachim Denil, University of Antwerp (NL)

We are seeking outstanding short paper (2 pages) submissions that will be presented in a poster format at the conference. Short papers should present interesting recent results, novel ideas or works-in-progress that are not quite ready for a regular full-length paper. Student papers are welcome. Poster track papers should use the standard template for submission, and submit papers 2 pages long only. Paper submissions are encouraged in all areas of modeling and simulation as mentionedin the Call for Papers. In particular we are seeking papers in the following areas:

- Computer/Communication Networks with Special Emphasis on Modeling and Simulation
- Numerical Simulation and Optimization as Applied to Business and Industry
- Use of Modeling and Simulation in the Area of Computer Security
- Modeling and Simulation in the area of Neural Networks
- Modeling and Simulation related to Image/Video Compression/Processing and Robotic Vision
- Any Aspect of Modeling and Simulation related to the Military
- Modeling, Analysis and Simulation of Telecommunication Systems
- Web-based Modeling and Simulation
- High-performance Computing and Simulation
- Network/Internet Traffic Modeling and Workload Characterization
- Simulation Languages, Tools, and Environments
- Simulation of Parallel Systems, Distributed Systems and Databases
- Simulation of Clusters, Grids and Wireless Systems
- Simulation of Multimedia Applications and Systems
- Modeling and Simulation of Real-Time and Embedded Systems
- Simulation Methodology, Theory and Philosophy
- Parallel and Distributed Simulators and Simulation Techniques

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## Project Management

**Track Coordinator:** Thomas Jefferson, Intel

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## Simulation Education

**Track Coordinator:** Saikou Diallo, Old Dominion University

**Simulation Education: Training and Educating the Next Generation of Scientists, Engineers, Artists, Humanists and Social Scientists**

Simulation is indeed a staple of scientific inquiry and its applications are wide-ranging. However, in order to make simulation truly ubiquitous, the challenge is to not only train and educate simulation professionals to engage and apply their knowledge to various domains but most importantly to train students and professionals in every domain to incorporate simulation in their daily activities.

The Simulation Education track is seeking **papers** and **panels** from professionals in all disciplines including but not limited to engineering, sciences, arts, humanities and social sciences to share experiments, lessons learned, projects, methods, tools and case studies on how to train and educate students, scientists, and scholars at all levels and of all kinds to adopt and incorporate simulation in their work.

Topics include, but are not limited to, the following:

- Simulation initiatives in the Arts, Humanities and Social Sciences
- Simulation educational initiatives in professional societies (e.g., NMSC, ACM SIGSIM, INFORMS)
- Simulation curriculums in K-12, trade schools and academic education
- Simulation curriculums in professional education
- Simulation initiatives in STEM/K-12
- Simulation education in Massive Open Online Courses (MOOCs)
- The use of blended learning approaches in Simulation education
- Using models and simulations to teach subjects other than Simulation

- Approaches and tools for teaching conceptual model development and Simulation
- Simulation certification for students and teachers
- Game-based learning
- Concepts for design and improvement of Simulation courses

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## Simulation Optimization

**Track Coordinators:** Scott Rosen and Peter Salemi, MITRE and Jie Xu, George Mason University

The Simulation Optimization track focuses on algorithms that can be coupled with computer simulations to locate specific input parameter values for the simulation that maximize or minimize a simulation performance measure of interest. This track is interested in papers on both theoretical aspects of algorithm development and applied aspects of simulation optimization pertaining to computational performance and algorithm evaluation. New real-world applications of simulation optimization are also of interest with more desired areas including healthcare, military and homeland security, critical infrastructure systems, cybersecurity, network applications, communications, financial engineering, and energy systems.

In regard to the methodological topic areas of interest, some of the more notable areas are listed below, although this track will not be strictly limited to this list.

- Global and black-box optimization
- Discrete optimization via simulation
- Random search methods
- Sample average approximation
- Stochastic approximation methods
- Model-based methods
- Metaheuristics
- Population-based methods
- Response surface methodology
- Ranking & selection
- Stochastic programming
- Approximate dynamic programming
- Optimal learning
- Stochastic gradient estimation
- Metamodels
- Robust simulation and optimization
- Data-driven decision making
- Multi-objective optimization

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## Social and Behavioral Simulation

**Track Coordinators:** Adolfo López Paredes, University of Valladolid (SP) and Xiao Song, Beihang University (CN)

Computer simulation is increasingly being adopted as a technique for achieving results in the social sciences. Formalized models enable a generative approach to science that can identify which kinds of micro-level interactions are sufficient to produce the known macro-level patterns observed in real societies. Simulation also allows social science researchers to explore out-of-equilibrium system behavior that is difficult to achieve with traditional analytical approaches.

The Social and Behavioral Simulation track will feature recent, principled work in this area. Projects related to all areas of the social and behavioral sciences will be represented, from artificial economics and cognitive process modeling to social network analysis and political science. We invite innovative and state-of-the-art contributions that model complex phenomena in any social sphere, and especially encourage implementations and demonstration of results.

Applications submitted to this track may be from various domains, including but not limited to:

- Anthropology
- Sociology
- Multi-agent modeling