CALL FOR PAPERS

IEEE Transactions on ENGINEERING MANAGEMENT

Special Issue: Modeling & Simulation in Disaster & Emergency Management: Planning, Strategy Formulation, Decision-Making, and Training

Guest Editors

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Theme

Disaster & Emergency Management is a critical concern for all sectors – all levels of government, global organizations (e.g., the United Nations and its various agencies), non-governmental organizations, and manufacturing and service industries.

On one hand, manufacturing and service firms, whether private, public or government-owned, manage facilities (plants, warehouses, distribution centres, retail/service sites, airports, seaports, etc.), manufacturing/service equipment (assembly lines, continuous process equipment, aircraft, maritime vessels, trains, oil rigs, etc.), information systems and other technological resources, materials/inventory, as well as human resources. A main objective would be preventing, or at least minimizing the risks of, the occurrence of industrial disasters and emergencies. But when they do occur, the objective then becomes one of securing the safety and integrity of the firm's resources, including the avoidance of undesirable effects on people onsite or offsite and on the environment, as well as ensuring business continuity.

On the other hand, governments at all levels, global agencies, and non-governmental organizations deal with natural disasters (in contrast to technological or man-made disasters) on a constant basis. The Centre for Research on the Epidemiology of Disasters (CRED) in Belgium defines a natural disaster as a situation or event, of natural origin, which overwhelms local capacity, necessitating a request for national or international level of external assistance. CRED classifies natural disasters into five groups – geophysical, meteorological, hydrological, climatological and biological. In particular, the first four groups of disasters will generally necessitate significant *engineering management* attention and efforts. Disasters cause considerable loss of lives, homes, and livelihood and absence or inadequacy of services. They also result in injuries, health problems, property damage, and social and economic disruption. Funds are often redirected from the government's development programs to relief and reconstruction assistance.

The increasing frequency and intensity of both man-made/technological and natural disasters are leaving more people vulnerable to the effects of disasters, resulting in more extensive and lasting damage, heavier losses, and wider dislocation worldwide. This underscores the need for more effective decision making during each of the four phases of disaster operations management – mitigation, preparedness, response and recovery. Computer-aided tools are increasingly relied upon to provide critical decision support and scientific evidence for those professionals involved in both industrial and civil disasters and emergencies. Decision-support systems must cope with the complexity and uncertainty involved with the modelling of the characteristics, behaviour and impact of various hazards, and other factors contributing to the emergency, the scheduling and assignment of differentially-skilled personnel and assets to specific tasks, and the reasonable assessment of the response and behaviour of the population under threat.

Effective disaster and emergency response is characterized by many stochastic variables (e.g. response time, availability of resources, evolution of the disaster scenario, etc.). These variables interact with each other and increase the complexity of the system over time. Often, the use of analytical models to support the proper management of emergencies does not guarantee reliable results. In fact, the analytical methods require simplifying assumptions that may affect the trustworthiness of the results themselves. In that context, it is therefore essential to be able to recreate the complexity of the real-world system

through a Modeling & Simulation (M&S) approach. M&S activities in the area of disaster and emergency management usually involve:

- the identification and assessment of possible accident scenarios and their effects through the use of complex mathematical models;
- planning and emergency management (operational procedures, suitable tools and dedicated infrastructure);
- solutions for training and exercises.

Modeling and managing unpredictability through simulation is the next horizon in the analysis of complex systems. The recent groundbreaking rise of Industry 4.0 technologies and solutions has given rise to a new human-computer interaction technology that allows actual users to experience a high sense of perception and immersion for training purposes as well as to be supported in decision-making and policy formation.
The special issue will solicit high quality papers in the following areas:

1. Papers that showcase the state-of-the-art in the design and application of M&S in industrial or civil disaster and emergency management.
2. Papers in industrial or civil disaster and emergency management that challenge, modify, or refine existing theory based on empirical research.
3. Papers in industrial or civil disaster and emergency management that empirically test new theory or propose new solutions.

The special issue encourages a variety of submissions and we would direct potential authors to the journal's mission and scope on this. We are particularly interested in papers that relate theory with the real world and thus contain relevant and practical engineering management implications. Contributions coming from literature reviews regarding advances in industrial or civil emergency and disaster management are also welcome.

Scope of the Special Issue

The special issue will be advertised at the **International Multidisciplinary Modeling & Simulation Multiconference (I3M 2018)** which will be held in Budapest on September 17-19, 2018.
Authors and experts who submitted relevant work to the various thematic conferences of I3M 2018 will be invited to extend their paper and consider submitting it to this Special Issue. **However, papers not submitted to the Conferences will be welcome.**

Eligible submissions can cover a broad range of topics related to technological advances and their impacts on various aspects of, and concerns in, Disaster and Emergency Management, including, but not limited to, the following topics:

- Disaster Prevention or Mitigation,
- Emergency Response,
- Safety Engineering,
- Industry 4.0,
- Industrial Engineering,
- Modeling & Simulation,
- Discrete Event Simulation,
- Agent-Based Modelling,
- Geographic Information Systems,
- Decision Support Systems,

- Virtual and Augmented Reality,
- Training Systems,
- Human Behavior in Emergencies,
- Policy/Strategy Formulation,
- Decision Making.

Notes for Prospective Authors

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere.
Conference papers may only be submitted if the paper has been completely re-written and if appropriate written permissions have been obtained from any copyright holders of the original paper.
Manuscripts should be submitted through the publisher's online system. Submissions will be reviewed according to the journal's rigorous standards and procedures through double-blind peer review by at least two qualified reviewers.

Submission Process: Please prepare the manuscript according to IEEE-TEM's guidelines and submit at the journal's Manuscript Central site (https://mc.manuscriptcentral.com/tem-ieee). Please clearly state in the cover letter that the submission is for this special issue.

Schedule

Submissions of full papers: February 28th, 2019

Guest Editor bios

Dr. Adriano O. Solis is an Associate Professor of Logistics Management and Decision Sciences at York University. He is currently the Director of the School of Administrative Studies (SAS) at York University, which houses the Disaster and Emergency Management graduate and undergraduate programs of York University. He is a member of the graduate faculty in Disaster and Emergency Management, and is an active collaborator in the Advanced Disaster, Emergency and Rapid Response Simulation (ADERSIM) program of York University. His research interests are in inventory systems modeling, supply chain management, intermittent/lumpy demand forecasting, applied modeling and simulation, and IT in operations and supply chain management. He has served as Program Chair of the Summer Computer Simulation Conference of the Society for Modeling & Simulation International (SCSC 2013, Toronto, Canada) and as General or Program Co-Chair of the International Conference on Modeling and Applied Simulation (MAS 2014, Bordeaux, France; MAS 2015, Bergeggi, Italy; MAS 2016, Larnaca, Cyprus; MAS 2017, Barcelona, Spain). He is General Co-Chair of MAS 2018 in Budapest, Hungary (September 2018). Dr. Solis holds BS and MS degrees in mathematics, an MBA, and a PhD in Management Science. Before joining York University, he was Associate Professor of Operations and Supply Chain Management at the University of Texas at El Paso. He has been a Visiting Professor in the Department of Mechanical, Energy and Management Engineering at the University of Calabria (Italy), where he has continued to supervise management engineering graduate students in their research work. His teaching is enhanced by industry experience, including having been Vice President and Division Manager for Professional Products and Systems in the Philippine operations of Philips Electronics, the Netherlands-based multinational company.

Dr. Leorey Marquez is a Senior Research Scientist with the Digital Productivity Flagship at the Commonwealth Scientific & Industrial Research Organisation (CSIRO), Australia's federal research agency. He has specialist expertise in mathematical modelling and land-use transport environment modelling and has developed numbers of software packages for such analysis, for example TOPAZ2000, LAIRDW and STEAM (Spatial and Transport Emissions Assessment Module). Prior to joining the CSIRO in 1993, he lectured at the Department of Decision Sciences at the University of Hawaii for 6 years. He received degrees in Statistics and Operations Research from the University of the Philippines and a Ph.D. in Communications and Information Science from the University of Hawaii. His areas of research include land use-transport-environment modelling, network optimisation, expert systems, and object-oriented analysis and design. He was responsible for modelling traffic congestion and population exposure to pollution in the BTRE-commissioned Study on GHG Abatement Measures for Urban Freight and also in the 1997 National Inquiry in Urban Air Quality. In 2015, Dr. Marquez was awarded a Balik-Scientist Grant to teach Simulation Modeling for Disaster Planning at the University of the Philippines College of Engineering.

Agostino Bruzzone is General Director of M&S Net (34 Centers worldwide) member of the McLeod Institute of Simulation Science,founder and member of the board of MIMOS, president for Simulation Team. He serves in the DIME at the University of Genoa as Full Professor and he is active in the field of simulator-based applications for defense and industrial applications coordinating many R&D projects involving innovative Modeling & Simulation (M&S), Intelligent Agents (IA), Artificial Intelligence (AI) and Design of Experiments (DOE). He has written more than 200 scientific papers plus reports in partnerships with major companies (e.g.IBM, ENI, Contship, Solvay) and agencies (e.g.NASA, European Defence Agency, NATO, Italian MoD, DGA, DoD). He teaches "Project Management", "M&S" and "HLA" and he is President of the MIPET (International Master Program in Industrial Plant Engineering & Technologies) of Genoa University. He is currently serving as M&S Project Leader for NATO STO Center for Maritime Research and Experimentation (CMRE). Prof. Bruzzone began his engineering studies at the Italian Naval Academy and earned his doctorship in Mechanical Engineering from Genoa University.

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