



European Safety and Reliability Association

Newsletter

<http://www.esrahomepage.eu>

December 2019

Editorial



*Roger Flage
University of Stavanger
Department of Safety,
Economics and Planning
Norway*

Dear ESRA Colleagues!

We are approaching the end of 2019, and with that also the end of a decade. As general secretary of ESRA with responsibility to follow up membership issues, I take this opportunity to give a summary of the status of ESRA memberships:

ESRA currently consists approximately 80 member organisations. About 3/4 of the membership mass is made up of academic institutions, and among the remaining 1/4 about half and half are professional organisations and commercial members. The five countries with the highest membership numbers are France (10 members), the UK (9 members), Norway (7 members), and Germany and the Netherlands (5 members each). ESRA also reaches beyond the European domain, with members also from Brazil, China, Israel, South Korea and the USA. I encourage current members to promote ESRA membership to organisations that they collaborate with in the field of reliability, safety and risk.

The planning of the ESREL 2020 / PSAM 15 conference, to be held in Venice, Italy 21-26 June 2020, is well underway. A large number of abstracts have been accepted and authors who are aiming for a full paper publication in the proceedings of the conference are now working hard to meet the 15 January submission deadline. I look forward to seeing many of you at what will for sure be a large and successful conference with the beautiful and historic city of Venice as a backdrop.

The ESRA board has received five applications in response to the 2019 call for support. This is a slightly higher number than in the past couple of years and hopefully an expression of an increasing desire to create activities that promote ESRA and support the ESRA objectives. ESRA annually announces this funding grant for activities related to organization of workshops, technical meetings, courses, summer schools and similar type of activities for the development and dissemination of reliability, safety and risk assessment and management methods, practice and culture. We look forward to announcing the support recipients early in January 2020 and to seeing the results of the supported activities later in the year. I take this opportunity to remind especially past recipients but also future recipients of their responsibility to first announce and subsequently to report on the outcome of their supported activity in the ESRA newsletter.

I wish all of you a happy holiday and look forward to collaborations and interactions in the New year and decade.

Roger Flage
ESRA General Secretary

Feature Articles

Smart Buildings: New Application Area for Safety and Security Risk Analysis



Balaji Kalluri
Technical University of Denmark,
Denmark



Igor Kozin
The Danish Institute of Fire and
Security Technology, , Denmark

Introduction

In the wake of rapid urbanization, the contemporary buildings are being transformed into complex cyber-physical systems (CPSs) in the process of mitigating their impact on climate and achieving sustainability, while meeting their primary goals viz. comfortable, productive, safe and secure built-environment. Integrating active building systems such as lighting, HVAC (Heating, Ventilation and Air-Conditioning), fire-safety, security etc., is central in building designs today. Smart Buildings (SBs) are an emerging class of building design that intelligently integrate these systems through Information and Communication Technologies, in order to regulate physical processes within the built-environment. Several fire incidents in modern building design process that blindfold fire protection are reported in literature (S.T. McKenna et al., 2019 and B. C. Roberts et al., 2016). Likewise, Building Management System can also be used as a backdoor to enter a larger ‘trusted’ network, thus exacerbating security risks when SBs are integrated to smart-grids (D. Fisk, 2012). More unprecedented safety and security hazards in integrated smart buildings (SBs) are expected to surface in future. Thus, SBs in cities exemplify a new application area for open challenge to risk analysis community.

The Goal

The authors envisage emergent hazards to compromise fire-protection in SBs. Thus, integration without systematic risk analysis shall leave SBs vulnerable to emergent hazards that may compromise safety, security and smartness. This article elucidates one such risk to fire-safety and propose a new approach to analyse them.

A Case of Smart Office Building

A building can be considered to be ‘smart’ if it has following capabilities namely, information processing, internal regulation, action in the real world, and knowledge acquisition (S. Alter, 2019). Currently, we are carrying out a research study in an office environment with the following functionalities integrated by design.

- 1.Security system implemented via authorized door-access controls
- 2.(Fire) Safety system implemented via automated fire alarm integrated with smoke detector
- 3.Ventilation system implemented using air-handling unit (AHU) combined with air-distribution system
- 4.Lighting system implemented as automated day-light sensing based dimming

We could argue that this office is a SB as it acquires information from visitors outside the building, together with sensors (smoke, light and temperature) from within the building in order to alter the physical process such as heat load, smoke, light intensity appropriately. Furthermore, a centralized controller embeds algorithms necessary to process information to make knowledgeable insights about the condition of built-environment, in order to regulate them as desirable. However, actions in the real world are carried out by diffusors, dampers, relays etc. It elucidates the potential fire safety risks arising due to the interaction between physical processes, systems and components within a built-environment.

Proposed Approach

Our systematic approach aims to identify key physical building processes in SBs, along with their functional and (system-level) operational interdependencies. For example, controlling latent heat load (labelled ‘CP’) and extracting smoke during the event of fire (labelled ‘CP1’) are potentially conflicting actions to be controlled cooperatively by central controller (labelled ‘C’) and actuator (in this case VAV damper, labelled ‘A’).

We model cyber-physical processes and components in SBs as nodes and information flow using edges of feedback control loops (abbreviated as FCL).

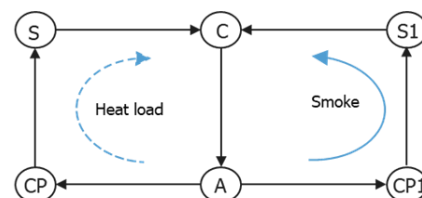


Figure 1 An illustrative model of cyber-physical processes in SBs represented as interdependent feedback control loops

Our practical approach explicates several possible topologies of FCL in SBs. This provides the ground for analysing risks using STPA (N. Leveson and J.

Thomas, 2018). Furthermore, emergent cyber-physical hazards to fire-safety can be identified using conceptual framework of uncontrolled flow of information and energy (UFoI-E) (N.H.C. Guzman et al., 2019).

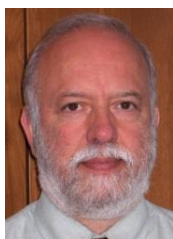
Summary

This study is a starting point that shall enable critical analysis of building designs in future which are otherwise under-examined for unprecedented cyber and physical threats.

References

- [1] McKenna, S.T., Jones, N., Peck, G., Dickens, K., Pawelec, W., Oradei, S., Harris, S., Stec, A.A. and Hull, T.R., 2019. Fire behaviour of modern façade materials—Understanding the Grenfell Tower fire. *Journal of Hazardous materials*, 368, pp.115-123.
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- [3] Fisk, D., 2012. Cyber security, building automation, and the intelligent building. *Intelligent Buildings International*, 4(3), pp.169-181.
- [4] Alter, S., 2019. Making Sense of Smartness in the Context of Smart Devices and Smart Systems. *Information Systems Frontiers*, pp.1-13.
- [5] Leveson, N. and Thomas, J., 2018. STPA handbook. NANCY LEVESON AND JOHN THOMAS, 3.
- [5] Guzman, N.H.C., Wied, M., Kozine, I. and Lundteigen, M.A., 2019. Conceptualizing the key features of cyber-physical systems in a multi-layered representation for safety and security analysis. *Syst. Eng.*, pp.1-22.

RESS News



*Carlos Guedes Soares
Editor-in-Chief RESS
Instituto Superior Técnico,
Universidade de Lisboa*

Methods and Applications RAMS Optimization in Complex Systems

The special issue on Methods and Applications RAMS Optimization has been published in volume 192 of December 2019 and was guest edited by David W. Coit and Enrico Zio., who I would like to thank for their successful efforts.

In their Editorial they introduce RAMS “as a formal engineering discipline, founded on mathematical

principles, particularly of probability theory and statistics, for systematically and rigorously analyzing functional problems in components and systems with the aim to produce a design with such desired properties. As an engineering discipline, RAMS engineering aims at analyzing and evaluating the ability of systems, products and services to perform the functions that they are intended to provide by design. For this, the concepts and methods for RAMS have been progressively developed and advanced to measure the goodness of design decisions with the aim of reducing failures and unplanned downtime for safety or economic reasons, and ultimately leading to optimal safety and economy of system operation.”

Large amount of effort are being made for the development and application of new methods for RAMS optimization, addressing various challenges in complex engineering system lifecycle management, under the global trend of systems integration. Mathematically, the innovative optimization methods that are being developed are challenged by several issues related to the problem of finding optimal solutions in irregular spaces characterized by non-linearity, non-convexity, time-dependency and uncertainty, for realistically reflecting the endogenous nonlinear and dynamic relationships emerging in complex engineering systems operating under exogenous uncertain conditions.

The special issue includes 15 papers out of the 49 submissions, the first of which is a state of the art review authored by the Guest Editors. The bulk of the papers cover two main aspects of System Design Optimization and Maintenance Optimization. The rest of the papers deal with testing and logistic problems related with warranties.

ESRA News

Conference Report: The International Conference on Information and Digital Technologies 2019 (IDT 2019)



*Elena Zaitseva
University of Zilina,
Slovakia*

The International Conference on Information and Digital Technologies 2019 (IDT 2019) is traditional event organized by the team from University of Zilina (Slovakia) in cooperation with ESRA. In the year 2019 IDT conference was held in Zilina (Slovakia) 25-27 June.

The Conference IDT 2019 (<http://idt.conf.sk/>) provides a forum for presentation and discussion of scientific contributions covering the theories and methods in the field of information and digital technologies, and their application to a wide range of industrial, civil and social sectors and problem areas. IDT 2019 is also an opportunity for researchers, practitioners, academics and engineers to meet, exchange ideas, and gain insights from each other. IDT 2019 offers a multidisciplinary platform to address the technological, societal and financial aspects of information systems.



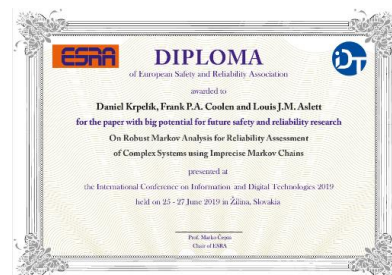
The conference program is divided into some workshops that cover numerous aspects of information and digital technologies:

- **International Workshop on New Frontier Information Digital Technology: From Logic Design To Real-World Applications** (chair: *Dr. Martin Lukac*, Nazarbayev University, Kazakhstan)
- **International Workshop on Biomedical Technologies** (chair: *Prof. Paolo Soda*, Università Campus Bio-Medico di Roma, Italy)
- **International Workshop on Reliability and Safety Technologies** (chairs: *Prof. Radim Bris*, VŠB - Technical University of Ostrava, Czech Republic and *Prof. Marko Cepin*, University of Ljubljana, Slovenia)
- **International Workshop on Computer-aided Modeling: Theory and Applications** (chairs: *Prof. Darya Filatova*, Kielce University of Technology, Kielce, Poland and *Prof. Charles El-Nouty*, Université Paris 13, Sorbonne Paris Cité LAGA, Paris, France)

Representatives of Institute of Information Technologies, VSB - Technical University of Ostrava, Gdansk University of Technology, University of Debrecen, and University of Žilina organized the International Workshop on Reliability and Safety Technologies (RaST 2019, https://idt.conf.sk/index.php?clanok=workshop_RT).



The goal of the RaST workshop was to bring together researchers and teachers from academy as well as developers and specialists from industry working in all areas of Reliability and Safety Technologies. Important participants were young researchers and PhD students who obtained invitations to participate in this event. The workshop focused on various problems of Reliability and Safety, such as Human Factor and Human Reliability, Mathematical Methods in Reliability and Safety, Safety and Risk Assessment, System and Structural Reliability, Software Reliability and Testing, Quantitative Risk Assessment, Uncertainty Analysis. All presented works were reviewed by at least two external independent experts. The organizational team would like to thank all of them for their contribution to the improvement of quality of the accepted presentations and papers. We expect that the presented papers will be indexed in well-known scientific repositories, such as Scopus and Web of Science.



The organizing committee prepared also several cultural and social events that were held in a pleasant atmosphere. Participants of the workshop visited famous Slovak medieval town Banská Štiavnica. The city is now an important center of recreation and tourism located in the center of Slovakia, which benefits from its rich historical heritage. The dominant of the city is the Old Castle from the Middle Ages considered as a “stone chronicle of the town”.



The next conference will be organized by the team from University of Zilina in June 2021. We will be glad to obtain your proposition about cooperation and new ideas for the Conference by e-mail of organization team idt@fri.uniza.sk or elena.zaitseva@fri.uniza.sk.

PhD Degrees Completed

PhD thesis in “Applying Reliability Engineering Techniques to the Process of Community Pharmacy Dispensing”



Matthew Naybour
Supervisor:
Prof. Rasa Remenyte-Prescott
University of Nottingham, UK

In September 2019, a PhD student, Matthew Naybour, at the University of Nottingham in the UK, has successfully defended his PhD thesis, entitled “Applying Reliability Engineering Techniques to the Process of Community Pharmacy Dispensing”.

The thesis focusses on applying reliability engineering techniques to the community pharmacy dispensing process in the UK. The research has been undertaken with the long-term aims of improving the reliability and efficiency of community pharmacy dispensing.

A detailed Coloured Petri Net (CPN) model of the dispensing process was constructed. The model includes coloured tokens which are used in the CPN to track the dispensing process at a high level of detail. The main novelty of the CPN model developed in this thesis is the ability to model the reliability and efficiency of a healthcare process in a single simulation-based model. Key model outputs related to pharmacy performance include the number of prescriptions dispensed, the number of dispensing errors, and the average waiting time.

In-field observations and interviews conducted at 4 UK community pharmacy sites are presented. Quantitative data was collected on the duration of individual stages

of the dispensing process, and qualitative interviews about the practice were recorded with practitioners. This data collection represents a novel research contribution, to the field of pharmacy safety and efficiency, since previous work on timing individual stages of the dispensing process has not been carried out before at the same level of detail. The results of a distribution fitting analysis of the data are then used in the CPN model, when simulating a typical UK pharmacy.

An Ant Colony Optimisation (ACO) framework is applied to the CPN model, to ascertain optimal pharmacy set-ups. Examples of decision variables include the number of dispensers and pharmacists to employ, the checking strategy to use, and the work pattern staff should follow. This framework can be used to aid decision makers by providing a Pareto front of non-dominated community pharmacy set-ups to choose from.

Please read the related publications:

[1] Matthew Naybour, Rasa Remenyte-Prescott, and Matthew J. Boyd. Reliability and efficiency evaluation of a community pharmacy dispensing process using a coloured Petri-net approach. *Reliability Engineering & System Safety*, 182:258-268, February 2019. <https://www.sciencedirect.com/science/article/pii/S0951832018305258>.

[2] Matthew Naybour, Rasa Remenyte-Prescott, and Matthew Boyd. Reliability modelling of dispensing processes in community pharmacy. In 10th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR), 13-15 July, 2018.

[3] Matthew Naybour, Rasa Remenyte-Prescott, and Matthew Boyd. Evaluation of a community pharmacy dispensing process using a coloured petri net. In Proceedings of the European Safety and Reliability Conference, ESREL, Trondheim, Norway, 17-21 June, 2018.

[4] Matthew Naybour, Rasa Remenyte-Prescott, and Matthew Boyd. Ant colony optimisation of a community pharmacy simulator using in-field quantitative data. In Proceedings of the European Safety and Reliability Conference, ESREL, Hannover, Germany, 22-26 September 2019.

Reliability Modeling of Probabilistic Competing Failures



Yujie Wang
Co-Advisers:
Professor Liudong Xing
Professor Honggang Wang
University of Massachusetts
Dartmouth, USA

Dependent behaviors involved in the operation of critical applications (e.g., wireless sensor networks, body sensor networks, Internet of Things and space-

mission systems) increase the complexity and difficulty of system reliability analysis. Addressing the dependent behaviors is crucial to accurate reliability modeling, and thus to the robust design, safe operation and effective maintenance for these critical systems.

Probabilistic function dependence (PFD) is one such a dependent behavior that exists in many real-world systems, where the malfunction of certain trigger component(s) causes other system components (referred to as probabilistic dependent components) to become unusable or inaccessible with certain probabilities.

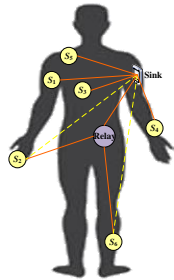


Figure 1. An example BSN for health monitoring

When the relay fails, the biosensor may increase its transmission power to directly connect to the sink device with a certain probability related to the percentage of remaining power. The biosensor becomes isolated to the BSN if its remaining power is insufficient to support such a direct transmission to the sink device upon the corresponding relay failure. Therefore, the biosensor has the PFD on the relay, and is referred to as a probabilistic dependent (PDEP) component of the relay (the trigger component). The PFD between different system components must be considered for accurate system reliability modeling. Further complicating the system reliability analysis is the probabilistic competing failure propagation and isolation effect. Specifically, a system undergoing PFD may exhibit diverse statuses due to time-domain competitions between propagated failure (PF) from a PDEP component and local failure (LF) of the corresponding trigger component. If the former occurs first, then a failure propagation effect is induced crashing the entire system; if the latter occurs first, then a failure isolation effect is induced in a probabilistic manner preventing the system function from being compromised by the PF.

Existing works have assumed the deterministic function dependence (DFD), i.e., the trigger failure (if occurring first) can induce a deterministic isolation effect to quarantine any PF originating from its corresponding dependent components. The DFD is not applicable to systems using relayed wireless communications (e.g. BSNs). In this dissertation work, combinatorial and analytical methods are proposed to evaluate the reliability of complex systems subject to PFD and associated probabilistic competing effects. Different types of systems are investigated, including systems with independent PFD groups [1], systems with multiple types of component LFs [2], systems with correlated PFD groups [3], systems with phase-dependent PFD groups [4], systems with multi-state components [5], and systems with sequence

dependence [6]. The proposed methods are applicable to arbitrary types of time-to-failure distributions for system components, as well as to diverse statistical relationships between LFs and PFs. Practical case studies of different IoT systems are performed to illustrate the proposed methodologies.

Building on the reliability analysis methods proposed in this dissertation research, design optimizations can be performed to identify the optimal system configuration given a set of system components, or to decide the optimal allocation of available component choices balancing system reliability and cost. Component sensitivity analysis can also be performed to identify the component that contributes the most to system reliability or performance, providing effective guidance to system upgrading or maintenance activities.

References:

1. Wang Y., Xing L., and Wang H. Reliability of systems subject to competing failure propagation and probabilistic failure isolation. *International Journal of Systems Science: Operations & Logistics* 2017, 4(3), 241-259.
2. Wang Y., Xing L., Wang H., and Levitin G. Combinatorial analysis of body sensor networks subject to probabilistic competing failures. *Reliability Engineering & System Safety* 2015, 142, 388-398.
3. Wang Y., Xing L., Wang H., and Coit D.W. System reliability modeling considering correlated probabilistic competing failures. *IEEE Transactions on Reliability* 2018, 67(2), 416-431.
4. Wang Y., Xing L., Levitin G., and Huang N. Probabilistic competing failure analysis in phased-mission systems. *Reliability Engineering & System Safety* 2018, 176, 37-51.
5. Wang Y., Xing L., and Mandava L. Probabilistic competing failure analysis in multi-state wireless sensor networks. *Proc. of The 64th Annual Reliability & Maintainability Symposium, Reno, NV, USA, January 22-25, 2018.*
6. Wang Y., Xing L., and Mandava L. Competing failure analysis in sequence-dependent systems. *Proc. of The 65th Annual Reliability & Maintainability Symposium, Orlando, Florida, USA, January 28-31, 2019.*

Calendar of Reliability and Safety Events

**XXII Edition of the course:
“RAM&PHM 4.0: Advanced
methods for Reliability,
Availability, Maintainability,
Prognostics and Health
Management of industrial
equipment**

9-12 December 2019

Milan, Italy

Author: Francesco Di Maio

The 2019 professional one-week training course: "RAM&PHM 4.0: Advanced methods for Reliability, Availability, Maintainability, Prognostics and Health Management of industrial equipment" will take place at Politecnico di Milano, Milan (Italy) on December 9-12.

The course will be the XXII edition of the series. The course is stimulated by the evidence that, in recent years, the volume of data and information available in the industry has been growing exponentially and more sophisticated and performing analytics have been developed to exploit them. This exciting situation offers great opportunities of optimized, safe and reliable productions and products, including optimal predictive maintenance for "zero-defect" production, with reduced warehouse costs and improved system availability with "zero unexpected shutdowns". To grasp some opportunities, new system analysis capabilities and data analytics skills are needed.

The goal of the course is to provide participants with advanced methodological competences, analytical skills and computational tools necessary to effectively operate in the areas of reliability, availability, maintainability, diagnostics and prognostics of industrial equipment. The course presents advanced analytics to improve safety, increase efficiency, manage equipment aging and obsolescence, set up condition-based and predictive maintenance.

Since the beginning, the course has been officially supported by ESRA and since 2005 official scholarships have been offered. The 2018 edition of the course has been supported by ESRA with two scholarships covering the registration fee. The 2018 scholarships have been offered to two Ph.D students, one of Politecnico di Milano (Milano, Italy) and the other of the University of Liverpool (Liverpool, UK).

The first part of the course is devoted to the presentation of advanced methods for the availability, reliability and maintainability analysis of complex systems and for the development of Prognostics and Health Management (PHM) and Condition-Based Maintenance (CBM) approaches. In this respect, the basics of Monte Carlo Simulation, nonlinear regression and filter models (Artificial Neural Networks, Principal Component Analysis, Auto-Associative Kernel Regression, Ensemble Systems, Hilbert Huang and Wavelet transforms) and evolutionary optimization methods (Genetic Algorithms) are illustrated. In the second part of the course, exercise sessions on Monte Carlo simulation, Artificial Neural Networks and Genetic Algorithms provide the participants with the opportunity of directly applying the methods to practical case studies. Finally, in the last part of the course, real applications of the advanced methods illustrated in the course are presented. The applications range from the evaluation of maintenance costs taking into account the reliability and availability of equipment, to the application of Monte Carlo Simulation for system availability analysis and condition-based maintenance management, to the use of regression and classification techniques for fault

detection, classification and prognosis in industrial equipment.

The European Safety and Reliability Association (ESRA) supports the course with two scholarships to be awarded to PhD students. Scholarships will be assigned considering the affinity of the research to the topics of the course, the quality of the CV and the number and impact of publications in the field.

Course program chair:

Prof. Francesco Di Maio,

Tel: (+39)02 2399 6372

Email: francesco.dimaio@polimi.it

**ENBIS Spring Meeting 2020
Degradation and Maintenance,
Modelling and Analysis
14 - 15 May, 2020
Grenoble, France**

Authors: Olivier Gaudoin / Christophe Berenguer – Grenoble Institute of Technology

It is our great pleasure to invite you to attend and contribute to the ENBIS Spring Meeting 2020, which will take place in Grenoble, France, on May 14-15, 2020.

ENBIS is the European Network for Business and Industrial Statistics. Its aim is to connect individuals and organizations, interested in theoretical developments and practical applications in the field of business and industrial statistics.

In the field of reliability studies, the multiplication of equipment control and monitoring systems implies that degradation models become more and more prominent over lifetime models. The modelling of degradation processes, the statistical analysis of the corresponding data and their use for the predictive maintenance of industrial systems are important and challenging issues. The aim of the ENBIS Spring Meeting 2020 is to bring together both academic and industrial statisticians interested in theoretical developments and practical applications in this field.

The topics of the meeting include:

- Stochastic degradation processes
- Statistical analysis of degradation data
- Predictive maintenance
- Maintenance modelling and optimization
- Statistical reliability
- Accelerated degradation tests
- Prognostic and health management
- Software development for degradation and maintenance analysis
- Case studies in reliability analysis

Key dates:

- Deadline for abstract submission: March 27, 2020.
- Deadline for notification of abstract acceptance: April 3, 2020.
- Deadline for early bird registration, reduced fees: April 24, 2020.

Conference website:

https://enbis.org/activities/events/current/628_ENBIS_Spring_Meeting_2020/

ESREL 2020 PSAM 15

21-26 June 2020

Venice, Italy

Don't miss the opportunity to contribute and participate to ESREL 2020 PSAM 15, the TOP conference in 2020 on Safety and Reliability. The Conference combines the 30th European Safety and Reliability Conference and the 15th Probabilistic Safety Assessment and Management Conference, and will be held in Venice, Italy, at Palazzo del Cinema, from June 21 to June 26, 2020. It will be a unique World Exposition (a real "Expo Tech") of scientific methodologies and technical solutions for the reliable design and operation of components and systems, for the prevention and management of risk in complex systems and critical infrastructures.

This Conference takes place only every eight years (Crete 1996, Berlin 2004, Helsinki 2012... and now Venice 2020) and brings together the TOP experts of the World in the science and practice of reliability and safety. It is a unique opportunity to advance knowledge in all fields of reliability and safety, by sharing achievements and challenges.

It provides a forum where to strengthen the multidisciplinary network of competent professionals, which is needed to face today's challenges in our rapidly evolving "risky" World: come and contribute to making it safer.

It is for contributing to the developments in the direction of a smart and sustainable World that you are invited to participate as main actor to the ESREL 2020 PSAM 15 Expo Tech Conference.

The online submission system is now open and you can submit your abstract at <http://esrel2020-psam15.org/authors.html>.

Important Dates:

Abstract Submission: 10th November 2019

Abstract Acceptance: 5th December 2019

Full Paper Submission: 15th January 2020

Acceptance Notification: 1st March 2020

Final Revised Full Paper Submission: 15th March 2020

Author Early-Bird Registration Closure: 15th March 2020

For more information visit the conference website : www.esrel2020-psam15.org

39th International Conference on Ocean, Offshore and Arctic Engineering (OMAE 2020) - Symposium on Structures, Safety and Reliability

28 June - 3 July 2020

Fort Lauderdale, USA

OMAE 2020 is the ideal forum for researchers, engineers, managers, technicians and students from the scientific and industrial communities from around the world to meet and present advances in technology and its scientific support, exchange ideas and experiences while promoting technological progress and its application in industry, and promote international cooperation in ocean, offshore and arctic engineering. Following the tradition of excellence of previous OMAE conferences, more than 900 technical papers are planned for presentation.

The OMAE Congress is organised in about 11 Symposia each dealing with specific topics. The Structures, Safety and Reliability Symposium, as the name suggests, deals with offshore structures safety and reliability, having typically between 100-150 papers. Typical sessions include Probabilistic and Spectral Wave Models, Probabilistic Response Modelling, Reliability of Marine Structures, Fatigue Reliability, Reliability of Mooring and Risers, Reliability Renewable Energy Devices, Risk based Maintenance planning and Risk Analysis & Safety Management.

Conference Chair:

Professor Manhar R. Dhanak

Institute for Ocean and Systems Engineering, Florida Atlantic University, USA

Conference Co-Chair:

Professor Ronald W. Yeung

University of California, USA

Technical Program Chair:

Professor Antonio C. Fernandes

COPPE/URFJ LOC, Federal University of Rio de Janeiro, Brazil

Safety and Reliability Symposium Coordinator

Professor Carlos Guedes Soares

Instituto Superior Técnico Universidade de Lisboa, Portugal

Contacts:

Specific questions can be addressed to the **Safety and Reliability Symposium Coordinator** at:

c.guedes.soares@centec.tecnico.ulisboa.pt

Conference Website: <https://event.asme.org/OMAE>

11th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR)

14 - 16 July 2020

Nottingham, United Kingdom

You are warmly invited to participate at the 11th IMA International Conference on Modelling in Industrial Maintenance and Reliability (MIMAR), which will take place in Nottingham, in the UK from 14-16 July, 2020.

Conference Chair:

Rasa Remenyte-Prescott, University of Nottingham, UK

Conference Co-Chair:

John Andrews, University of Nottingham, UK
 Jacqueline Bishop
 Phuc Do, University of Nottingham, UK

Scientific committee

Chair: Philip Scarf, University of Salford, UK
Co-Chair : Shaomin Wu, University of Kent, UK

Programme committee

Anne Barros, Norwegian University of Science and Technology, Norway
 Christophe Bérenguer, Grenoble Institute of Technology, France
 Inma Castro, Universidad de Extremadura, Spain
 Cristiano Cavalcante, Federal University of Pernambuco, Brazil
 David Coit, Rutgers University, USA
 Frank Coolen, Durham University, UK
 Li-Rong Cui, Beijing Institute of Technology, China
 Rommert Dekker, Erasmus University, The Netherlands
 Sarah Dunnett, Loughborough University, UK
 Richard Dwight, University of Wollongong, Australia
 Maxim Finkelstein, University of the Free State, South Africa
 Antoine Grall, University of Technologies de Troyes, France
 Carlos Guedes Soares, Instituto Superior Técnico, Universidade de Lisboa, Portugal
 Melina Hodkiewicz, University of Western Australia, Australia
 Geert van Houtum, Technische Universiteit Eindhoven, Netherlands
 Lisa Jackson, Loughborough University, UK
 Andrew Jardine, University of Toronto, Canada
 Vytis Kopustinskias, Joint Research Centre, Italy
 Gregory Levitin, The Israel Electric Corporation, Israel
 Luis Neves, University of Nottingham, UK
 Edoardo Patelli, University of Liverpool, UK
 Ed Pohl, University of Arkansas, USA
 Darren Prescott, University of Nottingham, UK
 Antoine Rauzy, Norwegian University of Science and Technology, Norway
 Adiel Teixeira de Almeida, Federal University of Pernambuco, Brazil
 Jin Wang, Liverpool John Moores University, UK
 Min Xie, City University of Hong Kong, China
 Enrico Zio, Politecnico di Milano, Italy
 Ming J Zuo, University of Alberta, Canada

Important Deadlines:
Abstracts of 100-200 words via
<https://my.ima.org.uk>: 2nd March 2020
Notification of abstract acceptance: 16th March 2020
Optional paper submission for conference
proceedings: 15th May 2020
Final deadline for acceptance for conference
proceedings: 15th June 2020
Submission of extended papers for consideration for
fully refereed special issue of Journal of Risk and
Reliability: 1st November 2020

Contact Information: conferences@ima.org.uk

Conference Website: <https://ima.org.uk/12183/11th-ima-international-conference-on-modelling-in-industrial-maintenance-and-reliability-mimar/>

18th International Probabilistic Workshop – IPW 2020

23 - 25 September, 2020
 Guimarães, Portugal

The 18th International Probabilistic Workshop (IPW2020) will take place in September 23-25, 2020, at University of Minho, Guimarães, Portugal. This workshop aims at providing an international forum for the debate on topics such as the resilience, robustness and redundancy of infrastructure systems, risk assessment and management, climate change and loading uncertainties, novel decision-making frameworks, and many other topics related to the fundamentals and application of probabilities. The IPW series was founded in 2003 in Dresden, Germany, and since then it was hosted by many other European countries, as Austria, Belgium, the Netherlands, Poland and the United Kingdom. It has been a place to bring together experts on different engineering and science fields, and doctoral students looking for broad knowledge. Expect a very open and friendly atmosphere, perfect for knowledge exchange, discussions and multidisciplinary collaboration.

Audience: The conference is intended for mechanical, civil and structural engineers and other professionals concerned with components, structures, systems or facilities that require the assessment of safety, risk and reliability. Participants could therefore be consultants, contractors, suppliers, owners, operators, insurance experts, authorities and those involved in research and teaching.

Key topics:

Safety, Risk, Probabilistic Modelling and Computation, Reliability, Structural Safety, Risk Analysis, Natural Hazards, Uncertainties.

Conference Language: English

Organisation:

José C. Matos University of Minho, Portugal, Co-Chairman

Paulo B. Lourenço, University of Minho, Portugal, Co-Chairman

Dirk Proske, Bern University of Applied Sciences, Switzerland, Co-Chairman

Deadlines:

Submission of abstract: November 30 2019,

Notification of acceptance of abstract: December 31 2019,

Submission of full paper: February 29 2020,

Notification of acceptance and mandatory changes: May 15 2020

Deadline for presenting author registration: June 15 2020

Conference Venue:

Campus de Azurém, University of Minho, Guimarães, Portugal

Further information:

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- Italian Chapter
- Polish Chapter
- Portuguese Chapter
- Spanish Chapter
- UK Chapter

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ESRA is a non-profit international organization for the advance and application of safety and reliability technology in all areas of human endeavour. It is an “umbrella” organization with a membership consisting of national societies, industrial organizations and higher education institutions. The common interest is safety and reliability.

For more information about ESRA, visit our web page at <http://www.esrahomepage.eu>

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