ESREL 2019
22-26 September, Hannover

29th International European Safety and Reliability Conference

September 22 - 26, 2019,
Leibniz Universität Hannover, Germany

PROGRAM

Safety & Reliability Theory and Applications

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Enrico Zio
(Conference General Co-Chair)

Stefan Bracke
(Technical Committee Chair)

Jasper Behrensdorf
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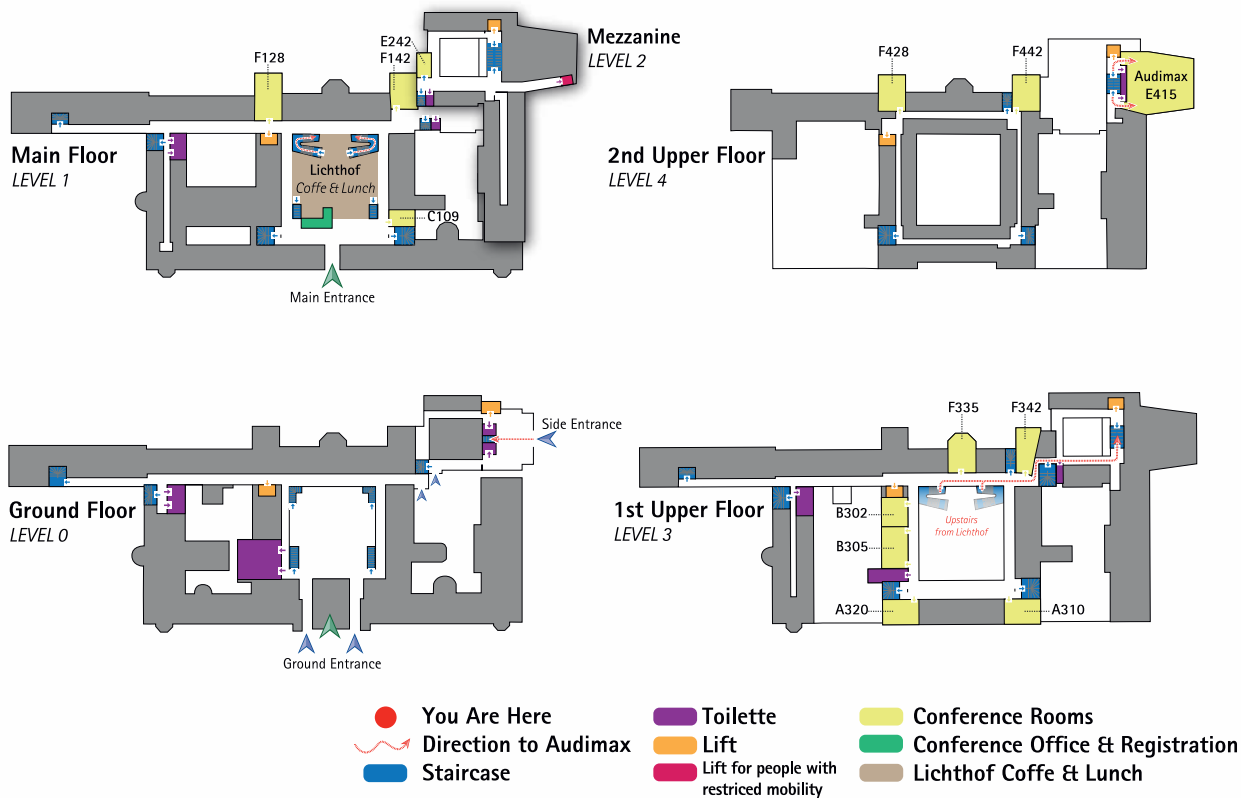Eduardo Patelli
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Matteo Broggi
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(Local Organizing Committee Co-Chair)

FLOOR PLAN

MAP of the Welfenschloss
Main Building

INSTITUTE FOR RISK AND RELIABILITY

ESREL 2019
22-26 September, Hannover

Main Floor
LEVEL 1

F128
E242
F142
Mezzanine
LEVEL 2
Lichthof
Coffe & Lunch
C109
Main Entrance

2nd Upper Floor
LEVEL 4

F428
F442
Audimax
E415

Ground Floor
LEVEL 0

Side Entrance
Ground Entrance

1st Upper Floor
LEVEL 3

F335
F342
B302
B305
Upstairs
from Lichthof
A320
A310

● You Are Here
〰 Direction to Audimax
▬ Staircase

■ Toilette
■ Lift
■ Lift for people with restriced mobility

■ Conference Rooms
■ Conference Office & Registration
■ Lichthof Coffe & Lunch

Welfenschloss and Hannover Congress Centrum (HCC)
Directional Map

INSTITUTE FOR RISK AND RELIABILITY

ESREL 2019

Hannover Congress Centrum (HCC):

OUT OF TOWN
U Hannover Congress Centrum (HCC) 11
Hannover Congress Centrum (HCC) 128 134
H
INTO TOWN
P
P
Eilenriedehälle MAIN ENTRANCE

Welfenschloss:

OUT OF TOWN
Welfenschloss SIDE ENTRANCE
Welfenschloss MAIN ENTRANCE
Leibniz Universität 4 5 U
P
INTO TOWN
N

● You Are Here
〰 Direction
▨ City Railway

P Car Park
U Tram Station
H Bus Stop

ESREL 2019 PROGRAM OVERVIEW

	Sunday, September 22, 2019	Room
09:30-16:30	Pre Conference Activities *Student Competition "Risk and geotechnical Engineering"*	F 335
17:00-21:00	Registration	Lichthof
18:00-21:00	Icebreaker / Reception	Lichthof
	Monday, September 23, 2019	
08:50-09:40	Opening Ceremony	Audimax E415
09:40-10:20	Plenary Lecture: Terje Aven	Audimax E415
10:20-11:00	Plenary Lecture: Phoon Kok Kwang	Audimax E415
11:00-11:30	Coffee Break	Lichthof
11:30-12:50	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
12:50-14:00	Lunch	Lichthof
14:00-15:20	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
15:20-15:40	Coffee Break	Lichthof
15:40-17:20	Parallel Sessions (10 parallel sessions, 5 papers per session)	All rooms
17:30-19:00	ESRA General Assembly Meeting	F 335
17:30-20:00	Social Events	
19:20-21:00	ESRA Dinner	A 320
	Tuesday, September 24, 2019	
09:00-09:40	Plenary Lecture: Jie Li	Audimax E415
09:40-11:00	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
11:00-11:30	Coffee Break	Lichthof
11:30-12:50	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
12:50-14:00	Lunch	Lichthof
14:00-15:20	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
15:20-15:40	Coffee Break	Lichthof
15:40-17:20	Parallel Sessions (10 parallel sessions, 5 papers per session)	All rooms
17:30-20:00	Social Events	
19:00-21:00	Technik-Salon	Kali-Chemie-Auditorium
	Wednesday, September 25, 2019	
09:00-09:40	Plenary Lecture: Luis G. Crespo	Audimax E415
09:40-11:00	Special Sessions (10 parallel sessions, 4 papers per session)	All rooms
11:00-11:30	Coffee Break	Lichthof
11:30-12:50	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
12:50-14:00	Lunch	Lichthof
14:00-15:20	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
15:20-15:40	Coffee Break	Lichthof
15:40-17:20	Parallel Sessions (10 parallel sessions, 5 papers per session)	All rooms
19:00-23:00	Conference Dinner	HCC
	Thursday, September 26, 2019	
09:00-10:20	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
10:20-10:50	Coffee Break	Lichthof
10:50-12:10	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
12:10-13:00	Lunch	Lichthof
13:00-14:20	Parallel Sessions (10 parallel sessions, 4 papers per session)	All rooms
14:20-14:40	Coffee Break	Lichthof
14:40-15:20	Plenary Lecture: Scott Ferson	Audimax E415
15:20-16:00	Closing Session	Audimax E415
17:30-20:00	Social Events	

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PREFACE

The 29th edition of the European Safety and Reliability Conference (ESREL) is held on 22 - 26 September 2019 in Hannover, Germany. This annual, international conference is run under the auspices of the European Safety and Reliability Association (ESRA) to provide a multi-disciplinary forum for the exchange of knowledge and expertise on theories and methods in the field of risk, safety and reliability, with applications to a wide range of industrial, civil and social sectors.

The conference contributes to addressing the strong need of advancements in the fields of reliability, risk and safety assessment and management, to cope with the challenges emerging in today's fast-developing World, where the interplay among technological, societal and financial systems needs to be attentively considered. While evolving and revolutionary innovations emerge, such as smart cities and systems or autonomous transportation, new hazards and risks develop, e.g. related to cybersecurity, data management, systems complexity and interdependencies, etc. In this challenging scenario, the 29th ESREL conference provides an opportunity to bring together professionals, academics, and individuals from institutions, industries and government agencies around the World to exchange information, share knowledge and discuss advancements in their research and practice.

The rich program of the conference offers 5 keynote speakers of international excellence, and 14 sessions with 10 parallel tracks for a total of 590 papers selected after rigorous peer-review, covering 19 methodological fields and 23 application areas, including (as "popular examples") system reliability, structural reliability, mathematical methods in reliability and safety, risk assessment, maintenance modelling and applications, human factors and cyber security.

As conference Chairmen, we look forward to the stimulating presentations at ESREL 2019 and the technical discussions which will emerge, and recognize that the success of a flagship conference like ESREL depends on the contributions of many individuals and organizations, who believe in the substantial scientific and technical work

that makes up the program. In this view, we thank all the authors who submitted their work to the conference. The quality of submissions this year was again extremely high and we feel gratified by the high quality of the resulting program. The organizing committee would also like to express the deepest appreciation to the technical program committee members and session chairs for their strong support to the conference preparation and development.

Finally, we thank all of you participants who have come to live the conference: we sincerely hope you find the program both stimulating and enjoyable!

Michael Beer
Enrico Zio

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www.uni-hannover.de

Organiser
INSTITUTE FOR RISK AND RELIABILITY

Engineering structures, infrastructure and systems are characterized by a rapid growth in scale, complexity and interconnection. As a result the gap between required and available information for numerical modeling is growing quickly as well, so that uncertainties and risks are involved in our models and analyses to a greater extent than ever before. Since our engineering structures, infrastructure and systems are, to a significant extent, critical for the functionality of our economic and societal life, they require proper approaches and measures to verify and ensure their reliable performance. Our research is focused on developing new theories, techniques and practical solutions to address this challenge with a combination of efficient computational modeling and advanced uncertainty quantification. Our research staff includes fifteen doctoral candidates, four postdocs and eight guest researchers for the year 2019 – 2020. Moreover, has six ongoing research projects funded by the German Research Foundation and the European Commission. Our research areas include Reliability and Robustness of Structures, Performance, Risk and Resilience of Complex Systems and Networks, Risk Reduction in Vague and Changing Environments, Planning and Simulation for Transportation Operations.

www.irz.uni-hannover.de

Organiser
EUROPEAN SAFETY AND RELIABILITY ASSOCIATION

The European Safety and Reliability Association is a non-profit international association for the advance and application of safety and reliability technology in all areas of human endeavor. It is an "umbrella" organization with a membership consisting more than 100 national professional societies, industrial organizations and higher education institutions. The common interest is safety and reliability. ESRA established the ESREL conference series, and is a co-organiser of each conference.

www.esrahomepage.eu

Collaborator
LIVERPOOL INSTITUTE FOR RISK AND UNCERTAINTY
www.liverpool.ac.uk/risk-and-uncertainty/

Collaborator
CENTER FOR DOCTORAL TRAINING IN RISK AND UNCERTAINTY

www.liverpool.ac.uk/risk-and-uncertainty-cdt/

Collaborator
VEREIN DEUTSCHER INGENIEURE (VDI)

www.vdi.de

Collaborator
KONFUZIUS INSTITUT HANNOVER

www.lkih.de

Collaborator
LEIBNIZ FORSCHUNGSZENTRUM ENERGY 2050

www.energie.uni-hannover.de

COMMITTEE ON PROBABILITY AND STATISTICS IN THE PHYSICAL SCIENCES

Bernoulli Society
for Mathematical Statistics
and Probability

www2.aueb.gr/bs-cpsps/

SHANGHAI INSTITUTE OF DISASTER PREVENTION AND RELIEF

www.idpr.sh.cn

GROSSRAUM-VERKEHR HANNOVER GmbH (GVH)

A whole is more than the sum of its parts: With this motto in mind six transport companies joined together in the Hanover region in order to offer passengers optimal connections and the best possible comfort. The GVH is the second oldest transport association in Germany and at the same time one of the most modern. With its buses and trams several hundred thousand persons are everyday "on the way in life".

You can imagine the local public transport in the Hanover region like a tightly woven network: 170 bus lines, 12 city tram lines, 9 regional and 9 suburban train lines provide good connections everywhere - in the city centers as well as in the surroundings and between the individual municipalities and small towns. The focus is always on the passenger: He gets quickly, conveniently and cost effectively to his destination. A total of more than 200 million GVH customers appreciate this offer every year.

www.gvh.de

EXIDA

Ensuring that operations are safe, equipment is available, and operational goals are met is exida's mission. We work closely with our customers to achieve high-impact, cost-effective solutions for their Functional Safety, Alarm Management, and IACS Cybersecurity challenges. As experts in safety, availability, and security, we bring a valuable perspective to the problems they are facing. exida assesses (but not limited to) the various standards: IEC/ISA 62443, IEC 61508, IEC 61511, IEC 61513, IEC 62061, ISO 13849, ISO 26262, NSI/RIA 1506, API 580, ASME B31.8s, EN 50128 / EN 50129, EN 50156 and more.

www.exida.com

SATODEV

SATODEV is a SME specialized in Reliability Availability Maintainability and Safety software.
We develop scientific computation solutions to match your business specific needs. SATODEV is also developer and official retailer of GRIF-Workshop the RAMS workshop of TOTAL. We propose advanced expert assessment to the software use for complex studies.

Thanks to our combined competencies in dependability and computer science, we can provide both theoretical and practical training on: Fault-Tree, Event-Tree, Reliability-Bloc-Diagram, SIL, Reliability-Network, Markov-Graph, Petri-Net, Stochastic-Bloc-Diagram, and Oil-And-Gas-Production-Availability-Study.

Whatever the customer, SATODEV provides personalized and direct contact, a great asset that allowed SATODEV to quickly find a position of choice facing major companies.

www.satodev.com

GERMAN RESEARCH FOUNDATION

The Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) is the central, independent research funding organisation in Germany. It serves all branches of science and the humanities by funding research projects at universities and other research institutions.

The DFG promotes excellence by selecting the best research projects on a competitive basis and facilitating national and international collaboration among researchers. Its mandate also includes encouraging the advancement and training of early career researchers, promoting gender equality in the German scientific and academic communities, providing scientific policy advice, and fostering relations between the research community and society and the private sector.

The Deutsche Forschungsgemeinschaft supports the ESREL 2019 under Grant No. BE 2570/9- 1.

www.dfg.de/en/

PLENARY SPEAKERS

TERJE AVEN,

PROFESSOR OF RISK ANALYSIS AND RISK MANAGEMENT, CENTRE FOR RISK MANAGEMENT AND SOCIETAL SAFETY, UNIVERSITY OF STAVANGER, NORWAY
PRESIDENT-ELECT OF THE SOCIETY FOR RISK ANALYSIS (SRA) 2017
CHAIRMAN OF THE EUROPEAN SAFETY AND RELIABILITY ASSOCIATION (ESRA) 2014–2018

RECENT ADVANCEMENTS IN RISK ANALYSIS AND MANAGEMENT

ABSTRACT

The paper provides some perspectives on the state-of-the-art of the risk field and science. It reviews and discusses some key developments made in recent years, with a focus on foundational issues. These include risk conceptualization and characterization, black swans and the integration of risk analysis and resilience-based thinking and approaches. The paper also provides some reflections on the link between risk, reliability, safety and security.

Keywords: risk science, uncertainties, black swans, resilience, safety, reliability

KOK-KWANG PHOON,

DISTINGUISHED PROFESSOR AND VICE PROVOST, DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING, NATIONAL UNIVERSITY OF SINGAPORE, SINGAPORE
ALEXANDER VON HUMBOLDT RESEARCH AWARD WINNER 2018
INTERIM DIRECTOR OF LLOYD'S REGISTER FOUNDATION,
INSTITUTE ON PUBLIC UNDERSTANDING OF RISK
ACADEMIC ADVISER TO THE GLOBAL RISKS REPORT 2017 OF THE WORLD ECONOMIC FORUM

JIANYE CHING,

DEPARTMENT OF CIVIL ENGINEERING, NATIONAL TAIWAN UNIVERSITY, TAIWAN

MANAGING UNCERTAIN GROUND TRUTH USING BAYESIAN MACHINE LEARNING

ABSTRACT

Two disparate trends can be easily discerned. One, digital technologies are evolving by leaps and bounds. The volume, variety, and velocity of data can only increase. A geotechnical engineer will soon be asking what to do with this deluge of data. This is a fundamental shift from an existing environment that is data poor. Second, engineered systems are increasing in scale, complexity, interconnectivity, among others and the emerging resilience engineering paradigm in response to this challenge is to design for both expected and unexpected conditions. There is no precedent if a condition is truly unexpected. Although the geotechnical engineering profession has been successful in managing uncertain ground truth with very limited data, this practice is unlikely to meet these challenges and to exploit new opportunities. This paper discusses the application of Bayesian machine learning to characterize site effects and to estimate soil/soil properties under a set of general constraints abbreviated as MUSIC-X (Multivariate, Uncertain and Unique, Sparse, Incomplete, and potentially Corrupted data with variations in space/time). More research beyond this modest start is needed to understand how to exploit existing databases along this data-driven pathway to support decision making.

Keywords: Risk, uncertainty, geotechnical data, MUSIC-X, digitalization, Bayesian machine learning.

JIE LI,

DISTINGUISHED PROFESSOR, COLLEGE OF CIVIL ENGINEERING, TONGJI UNIVERSITY, SHANGHAI, CHINA
PRESIDENT OF THE INTERNATIONAL ASSOCIATION FOR STRUCTURAL SAFETY AND RELIABILITY
DIRECTOR OF THE SHANGHAI INSTITUTE FOR DISASTER PREVENTION AND RELIEF
DIRECTOR OF THE INTERNATIONAL JOINT RESEARCH CENTER FOR ENGINEERING RELIABILITY AND STOCHASTIC MECHANICS (CERSM)

PROBABILITY DENSITY EVOLUTION - A UNIFIED PERSPECTIVE FOR ENGINEERING RELIABILITY ANALYSIS OF STRUCTURES AND LIFELINE NETWORKS

ABSTRACT

On the basis of the principle of probability preservation and its random event description, a new kind of probability density evolution method (PDEM) has been developed by Li and Chen at the beginning of this century. The existing investigations demonstrate that the generalized probability density evolution equation (GDEE) reveals the secret of randomness propagating in a physical system: the transition of probability density of a stochastic system definitely relies on the change of physical state of the system. By virtue of these developments, a series of physically-based studies on system reliability have received extensive attention, and therefore supply a unified perspective for engineering reliability analysis of structures and lifeline networks. This paper briefly describes the theoretical foundation of probability density evolution method in view of a broad background, and a general framework for engineering reliability analysis, termed as the Physically-based Comprehensive Method (PCM), is proposed. For illustrative purposes, two cases are addressed to prove the value of the proposed method.

Keywords: probability density evolution method, engineering reliability, physically-based comprehensive method, structures, lifeline systems.

LUIS G. CRESPO,

NASA LANGLEY RESEARCH CENTER

AN INTRODUCTION TO SLICED-NORMAL DISTRIBUTIONS

ABSTRACT

Sliced-Normals (SN) enable the characterization of complex multivariate data as both a vector of possibly dependent random variables and as a semi-algebraic, tightly enclosing set. The versatility of SNs enables modeling complex parameter dependencies with minimal effort. A polynomial mapping is defined which injects the physical space into a higher dimensional (so-called) feature space. Optimization-based strategies for estimating SNs from data in both physical and feature space are presented. The formulations in physical space yield non-convex optimization programs whose solutions achieve the best performance. However, the formulations in feature space yield either an analytical solution or a convex program thereby facilitating their application to high dimensional datasets. Numerical experiments suggest that SNs are more versatile than most copula families thanks to their ability to handle multi-modal distributions with non-monotonic dependencies. Furthermore, whereas the selection of a copula structure is cumbersome process requiring extensive expertise, the selection of a SN structure only requires prescribing the degree of the polynomial mapping. Additionally, the closed and semi-algebraic form of the level sets of a SN density makes them amenable to rigorous uncertainty quantification. In this talk we use Scenario theory to rigorously bound the probability of new unseen data falling outside any of such level sets, and present a chance-constrained optimization framework for eliminating the effects of outliers in the identified uncertainty model. The strategies above can be used to mitigate the conservatism intrinsic to many methods in system identification, fault detection, robustness analysis, and reliability-based design.

SCOTT FERSON,

PROFESSOR, SCHOOL OF ENGINEERING, UNIVERSITY OF LIVERPOOL, LIVERPOOL, UK
DIRECTOR OF THE LIVERPOOL INSTITUTE FOR RISK AND UNCERTAINTY
DIRECTOR OF THE EPSRC AND ESRC CENTRE FOR DOCTORAL TRAINING IN QUANTIFICATION AND
MANAGEMENT OF RISK & UNCERTAINTY IN COMPLEX SYSTEMS & ENVIRONMENTS

PREDICTION AND DECISION MAKING FROM BAD DATA

ABSTRACT

Engineering has entered a new phase in which ad hoc data collection plays an ever more important role in planning, development/construction, operation, and decommissioning of structures and processes. Intellectual attention has largely focused on exciting new sensing technologies, and on the prospects and challenges of 'big data'. A critical issue that has received less attention is the need for new data analysis techniques that can handle what we might call bad data that does not obey assumptions required for a planned analysis. Most widely used statistical methods, and essentially all machine learning techniques, are limited in application to situations in which their input data is (i) precise, (ii) abundant, and (iii) characterised by specific properties such as linearity, independence, completeness, balance, or being distributed according to a named or particular distribution.

Although statistical techniques have been developed for situations in which some of these requirements can be relaxed, the techniques often still make assumptions about the data that may be untenable in practice. For instance, methods to handle missing data may assume the data are missing at random, which is rarely true when sensors fail under stress. Of course, even in the age of big data, we may have small data sets for rare events such as those associated with tiny failure rates, unusual natural events, crime/terror incidents, uncommon diseases, etc. Although many statistical methods allow for small sample sizes, they generally require data to be representative of the underlying population, which can be hard to guarantee. Moreover, not all uncertainty has to do with small sample sizes. Poor or variable precision, missing values, non-numerical information, unclear relevance, dubious provenance, contamination by outliers, errors and lies are just a few of the other causes that give us bad data.

We review the surprising answers to a few questions about bad data:

- How can we handle data that is incomplete, unbalanced, or has missing or censored values?
- When investing in sensors, when are more sensors preferable to more precise sensors?
- What can be done with ludicrously small data sets, like n=8, or n=2, or even n=1?
- What if the data are clearly not collected randomly?
- Can bad data be combined with good data? When shouldn't they be combined?
- When can increasing the number of sensors counterintuitively increase uncertainty?

Analyses can be conducted along a spectrum of increasing robustness from assumption laden to assumption free. Software tools are needed to track the assumptions we are making in data analyses and automatically characterise the robustness of the estimations and conclusions we draw from them.

SPECIAL SESSIONS & WORKSHOPS

ASSOCIATED EVENT

TECHNIK-SALON: HOW DO WE SURVIVE THE FUTURE?

Tuesday, September 24, 2019, 19:00

With:
Kok Kwang Phoon (National University of Singapore),
Scott Ferson (University of Liverpool, UK),
Jie Li (Tongji University Shanghai, China),
Enrico Zio (Politecnico di Milano, Ialien)

"Are we ready for the risks of tomorrow?" asks the Technology Salon international risk researchers, who meet during the "European Safety and Reliability Conference 2019" (ESREL) in Hannover.

On our podium, four international researchers make a statement as to which sources of danger they are most interested in and which measures they recommend. We then discuss whether common experiences and recommendations - in the sense of best practice - can be derived from the risk and safety cultures of different regions of the world.

The lectures and the discussion take place in English. For this purpose, short summaries are provided in German.

ENCOUNTERS WITH TECHNOLOGY

The Technology Salon is the cultural podium for technology at Leibniz Universität Hannover. The events are public and also address the interested city audience.

The Technology Salon is supported by the Leibniz Universität and its engineering faculties, by a number of cooperation partners and a development association.

Location:
Leibniz University
Kali-Chemie Auditorium
Callinstrasse 9, 30167 Hannover
S-Bahn 4 | 5 to Schneiderberg

TC 304 SPECIAL SESSION

GEOTECHNICAL RISK, RELIABILITY, AND DATA ANALYTICS

Tuesday, September 24, 2019, 11:30-12:50 & 14:00 -15:20

Sponsored by:
TC304 (Engineering Practice of Risk Assessment & Management), International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE)

Organizers:
Jianye Ching and Kok-Kwang Phoon

This session focuses on the characterization of uncertainties and variabilities encountered in geotechnical engineering, such as the inherent spatial variability of ground properties, uncertainty in subsurface stratigraphy when interpreting limited site investigation data, and model uncertainty, as well as effective and efficient analysis/ design approaches to assure performance in the face of these uncertainties and variabilities. The two distinctive features in geotechnical engineering are the use of natural non-engineered geo-materials and no two sites are perfectly identical. Both practical applications for reliability-based design code calibration and quantitative risk assessment and novel methodological developments including emerging areas such as machine learning and artificial intelligence are included.

RESET WORKSHOP

Tuesday, September 24, 2019, 14:00-17:20

The MSCA-RISE-2016 project RESET aims to develop and apply knowledge in Reliability and Safety Engineering and Technology (RESET), for safe and reliable design and operation of large maritime (marine and offshore) and other made-to-order (MTO) engineering systems. The project is multi-disciplinary and inter-disciplinary of the duration of 48 months and has created a consortium of complementary expertise targeting areas of academic and industrial importance.

In the context of this project, a workshop is given in parallel of the regular ESREL conference. The first workshop, held during the ESREL 2018 conference in Trondheim, allowed the members of the consortium to exchange their research achievements obtained during the ongoing staff exchange projects. Similarly, the members will deliver this at the present workshop.

Location:
Senatssaal F335
Welfenschloss Main Building

ESRA & SOCIAL EVENTS

ESRA EVENTS (FOR ESRA REPRESENTATIVES ONLY)

Monday, September 23, 17:30 – 19:00, ESRA General Assembly Meeting, Room F335

Monday, September 23, 19:20 – 21:00, ESRA Dinner, Room A320

SOCIAL EVENTS

Sunday, September 22, 18:00 – 21:00
Icebreaker and Welcome Reception, Lichthof

Wednesday, September 25, 19:00 – 23:00
Conference Dinner, Hannover Congress Centrum (HCC) Eilenriedehalle

Monday, Tuesday & Thursday, September 23, 24, 26, 17:30 – 20:00
Several social events are organized as part of ESREL 2019. The events were booked on a first come first served basis during registration. Below you will find descriptions of the available events. Enquiries for any available openings for the tours can be made at the conference office.

Date, time, and meeting information for your booked event can be found on the back of your conference badge.

Great Gardens and Glittering Grotto
Accompany us on this very special tour and experience the extraordinary beauty of the baroque Great Gardens. The tour features the magnificent water displays, sculptures, the garden theatre and Niki de Saint Phalle´s magical grotto.

City-Hectic and History
Take a trip through time on a walk through the downtown area and a thousand years of Hanoverian history. From humble beginnings, through royal glory, destruction and rebirth to the most recent developments on the evolution of the modern city.

Brewery visit ‚Herrenhäuser'
Visit the Herrenhäuser Brewery and learn how their beer is made. After the visit you will of course have the opportunity to taste their excellent beers with a small snack.

Brewery visit ‚Gilde'
Come visit Gilde Brewery and experience how their beer specialities are brewed with great care, age-old tradition and ultramodern technology. The visit ends with a little snack and a delightful sampling of their outstanding beer specialities.

GENERAL INFORMATION

DESTINATION

Welfenschloss
Leibniz Universität Hannover

The conference building is the idyllic Welfenschloss, the heart of the Leibniz Universität Hannover. Originally constructed as a summer residence by the House of Hannover, it has served as the main building of the Leibniz Universität Hannover since 1879. Located only 25 minutes by foot from the city center and enclosed by beautiful parkways, the sorrounding region is a popular recreational area for students and locals alike.

DIRECTIONS

By train

After arrival at the central station of Hannover (**Hannover Hauptbahnhof**) cabs are available at both exits of the building. For further public transport, we strongly recommend the usage of the Hannover tram system (**Üstra**). Even though the train station is also acting as a tram station, the most convenient access to the tram system is the Kröpcke hub station 200 metres south of the main station. After exiting the main station in the southern direction (**following the City signs**) simply walk straight along the subterranean shopping lane until you reach the Kröpcke station. Inside the station follow the guidelinies to lines 4 (**Garbsen**) or 5 (**Stöcken**). Ride these tram lines for three stops until you reach the Leibniz University (**Leibniz Universität**) station. You will exit the tram directly in front of the university building where the conference is being held.

Tram lines 4 and 5 are the only direct stops at the university, so in any case (e.g. if you want to reach the conference from your hotel) it is reasonable to change to these lines at the central hub stations Kröpcke or Aegidientorplatz, as virtually all lines intersect at these two stations.

By plane

The closest airport is Hannover Airport, located roughly 10 kilometers from the conference venue. You will enter the main halls of the airport after arrival at Hannover and clearing all customs procedures. Follow the signs for the train station, which is located directly below terminal C. Between 03:35 AM and 01:05AM the shuttle train S5 is departing every 30 minutes towards Hanover main station (**Hauptbahnhof**). The ride will take approximately 20 minutes. Once you arrive at the main station, simply follow the instructions given above.

By car

Hannover is connected fairly well to the highway system of Germany. Depending on the direction you arrive from, the route to the conference venue may be very for each traveler. Once you reached the university grounds, there is usually very limited parking space directly on the spot. During the first day (Sunday) it is very possible to get access to a parking spot directly in front of the university's main building. This might not be the case during weekdays. If you do not want to use public transportation during the conference, please contact someone of the conference team to ask where parking spots are available.

GVH – S-Bahn

After the registration at the conference, every participant will receive a name badge. This includes the tram ticket, which is valid for the period from 21 to 27 September 2019. The tram tickets can be used all day (until 5 am of the following day) for travel on all means of transport of the GVH partners in the second class - including trams, trains and buses - within the entire fare area (ticket zones "Hannover", "Umland" and "Region").

The same applies to the print@home ticket. However, since this should only be used as a ticket to get to the conference venue for the registration, this is only valid on 21 and 22 September.

SPECIAL TRAMS TO HANNOVER CONGRESS CENTRUM (HCC)

There will be a special trams that carry the conference members from the Welfenschloss main building to the location of the conference dinner at the Hannover Congress Centrum (HCC). To reach the tram station follow the directional map on the inside cover. If you don't want to use this special services use line 11 towards "Hannover Zoo" to reach the dinner venue at "Hannover Congress Centrum". After the dinner extra trams to the city centre will be available in addition to the regular schedule

Time:
The times will be posted in the Lichthof.
Wednesday, September 25

Location:
From
tram station "Leibniz University"
to
tram station "Hannover Congress Centrum (HCC)"

CONFERENCE APP

A mobile web application for the conference is also available. Here you can access detailed information on the scheduled talks and any last-minute changes to the program. The app allows you to find your personal highlights at the conference and build your personal agenda. The app will be available a few days prior to the conference. Since it is a web application no installation is required. Just visit the following link or use the QR-Code located below:
https://esrel.lineupr.com/2019

GUIDELINES FOR PRESENTERS AND SESSION CHAIRS

Each presentation has been allocated 15 minutes, with an additional 5 minutes for discussion. Please, keep to the scheduled times so that the conference can run smoothly and participants can attend the talks they wish to see. Session chairs have been asked to keep exactly to the timetable.
Presenters should upload their presentation onto the presentation computers before their session using a USB memory device.
These computers are running the Windows operating system. Please, keep in mind to bring your presentation files as either PowerPoint or PDF.
Presenters are strongly discouraged from using their own computers and should do so in exceptional cases only. Changing computers takes time away from other presenters and valuable discussions. In these special cases, presenters should verify that their presentation works by connecting their device to the projector in the room where they will present and test their presentation out before beginning their session. Conference staff will be there during the breaks to help.
Presenters should meet the Session Chair during the break before the session. They are encouraged to provide very short written biographical statements to the Session Chair in advance.

Session Chairs have the responsibility to introduce the speakers, to lead the discussions, and to ensure that the session schedule is observed. Every effort should be made to keep to the 20-minute total time allocation for each presenter to ensure the next talk starts on time. If a session presenter does not show up, the Session Chair should compensate, as much as possible, by allowing for appropriately extended discussion of the presented papers while maintaining the presentation sequence, and ensuring that the next speaker starts at the publicised time.

INTERNET ACCESS

Free WiFi network access is provided everywhere at the conference locations.

Network: ESREL2019
Password: H3vKa2jN

REGISTRATION DESK

Sunday – 22nd September:	17:00 – 21:00
Monday – 23rd September:	08:00 – 17:20
Tuesday – 24th September:	08:00 – 17:20
Wednesday – 25th September:	08:00 – 17:20
Thursday – 26th September :	08:00 – 11:30

CERTIFICATE OF ATTENDANCE

If you would like to receive a printed certificate of attendance you can request one at the registration desk.

BEST STUDENT POSTER CONTEST

After a preselection process from the conference organizers, 20 research works carried out by students have been selected to present a poster. These posters are exposed in the "Lichthof", the main conference. Every conference participants will be able to cast their preference for the best poster trough the "Survey" function in the ESREL 2019 phone app. The winners of the best poster will be announced and awarded during the conference dinner.

LANGUAGE

The official language of ESREL 2019 is English.

CATERING

The Catering will be located at the Lichthof in the Welfenschloss.

SECURITY

Your name badge must be worn at all times otherwise you will not be allowed entry to the main conference sessions.

FIRST AID

Should you require any assistance, please contact a member of the Conference Team located at the registration desk.

PARALLEL SESSIONS

23.09. MONDAY, 11:30-12:50,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M01 - SESSION 1	M12 - SESSION 1	M11 - SESSION 1	M06 - SESSION 1	M07 - SESSION 1
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Stig O. Johnsen	Marc Fina	Edoardo Patelli	Nicolae Brinzei	Piero Baraldi
TOPIC	Accident and Incident Modeling	Structural Reliability	Simulation for Safety and Reliability Analysis	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
11:30-11:50	**Inger Lise**, Johansen Tore Askeland, Cato Dørum	**Marc Fina,** Patrick Weber, Werner Wagner	**Florian Blandfort,** Christian Glock, Jörn Sass, Stefanie Schwaar, Rabea Sefrin	**Mariëlle Stoelinga,** Enno Ruijters, Carlos Budde, Muhammad Chenariyan Nakhaee, Doina Bucur, Djoerd Hiemstra, Stefano Schivo	**Enrique López,** Iván González, José Cáceres, Mónica López-Campos
	Use of Heinrich factor in ship collision risk assessments in bridge design	Modeling of aleatory and epistemic uncertainties in probabilistic design of cylindrical shells	Subset Simulation Interpolation - A New Approach to Compute Effects of Model-Dynamics in Structural Reliability	FFORT: A benchmark set for fault tree analysis	Graph Convolutional Networks for Health State Diagnostics
11:50 12:10	**Jacek Skorupski**, Michał Kozłowski, Anna Kwasiborska, Anna Stelmach, Paulina Rutkowska	**Guijie Li,** Fayuan Wei, Zeshu Song, Chaoyang Xie	**Martina Kloos,** Joerg Peschke	**Andrei Gribok,** Ted Wood	**Caio Souto Maior,** Monalisa Santos, João Santana, Ana Claudia Negreiros, Márcio Moura, Isis Lins, Enrique Droguett
	Evaluation of the Probability of Aerodrome Traffic Incident Transformation into Accident	The Reliability Analysis for the Hybrid Uncertain structure with the Fuzzy Failure Criterion based on Non-Probabilistic Theory	Monte Carlo and Dynamic Event Tree Simulation for Assessing the Potentials of Tube and Pipe Ruptures	Advanced Probabilistic Risk Assessment through Continuous Fault Trees using R Functions	Convolutional Neural Network for remaining useful life prediction based on vibration signal
12:10-12:30	**Jon Arne Glomsrud**, Jing Xie	**Kaixuan Feng,** Zhenzhou Lu	**Adolphus Lye,** Alice Cicirello, Edoardo Patelli	**Alexis Linard,** Marcos Bueno, Doina Bucur, Marielle Stoelinga	**Mingjing Xu,** Piero Baraldi, Sameer Al-Dahidi, Enrico Zio
	A Structured STPA Safety and Security Co-analysis Framework for Autonomous Ships	Reliability Analysis Method Considering Random, Interval and Fuzzy Parameter Uncertainties Compounded by Ontological Ambiguity	A Review of Stochastic Sampling Methods for Bayesian Inference Problems	Induction of Fault Trees through Bayesian Networks	Fault Prognostics in Presence of Event-Based Measurements
12:30-12:50	**Eivind H. Okstad**, Ranveig Kviseth Tinmannsvik	**Peng Huang,** Hong-Zhong Huang, Hua-Ming Qian	**Junming Hu,** Yan Li	**Austin Lewis,** Katrina Groth	**Enrique Droguett,** David Verstraete, Mohammad Modarres
	Investigation Methods for Fish-escape Events in Norwegian Aquaculture	Structural Reliability Analysis Based on Random Variables and Interval Variables	Bayesian Inference for Power Law Process Based on WinBUGS	A Review of Methods for Discretizing Continuous-Time Accident Sequences	A Deep Adversarial Approach Based on Multi-Sensor Fusion for Remaining Useful Life Prognostics

23.09.   MONDAY, 11:30-12:50,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M13 - SESSION 1	T12 - SESSION 1	M09 - SESSION 1	M14 - SESSION 1	T07 - SESSION 1
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Raphael Moura	Francisco Brocal	Marco Cepin	Jon T. Selvik	Pierre Dersin
TOPIC	System Reliability	Occupational Safety	Risk Assessment	Uncertainty Analysis	Land Transportation
11:30-11:50	Xinchen Zhuang, Tianxiang Yu, Bozhi Guo	Chris Bachtsetzis, George Athanasiou	Marina Roewekamp, Benjamin Brück	Nils Wagner, Sifeng BI, Michael Beer, Morvan Ouisse	Lars Hurlen, Mikael Rosenqvist, Grete Rindahl, Harald Ulsten, Asgeir Drøivoldsmo
	Dynamic reliability evaluation of binary weighted k-out-of-n system with dependent components	The Occupational Hazard of Needlestick Injuries in the Medical Environment. Evidence from the Bank of Cyprus Oncology Centre in Cyprus from 2006-2017	Use of OECD Nuclear Energy Agency Database Project Operating Experience for Probabilistic Safety Assessment	Model Updating of Model Parameters and Model Form Error in a Uniform Framework	Traffic Control Center Design Concept for the Norwegian Railway
11:50 12:10	Ellen Lycke, Peter Okoh, Tor Onshus, Einar Winther-Larssen, Jone Nicolai Sigmundstad	Petra Roupcova, Karel Klouda, Sarka Bernatikova, Marek Nechvatal, Katerina Batrlova	Pavel Krcal, Ola Bäckström	Nick Gray, Scott Ferson, Marco De Angelis, Dominic Calleja	Piotr Smoczyński, Adrian Gill, Mateusz Motyl, Tomasz Staśkiewicz
	Independence Classification, Split Logic and Shared Final Element for All-Electric Subsea Safety System	New Risks in Ohs With the Focus on Selected Nanotechnological Workplaces	Bounded Dynamic Analysis Of Large Scale PSA With Cold Spares And Repairs	A Problem in the Bayesian Analysis of Data without Gold Standards	Possible use of responsibility trees in safety authorization of light rail vehicles
12:10-12:30	Jiangyun Zhen, Jinyong Yao, Tao Sheng	Vojtech Jankuj, Miroslav Mynarz, Petr Lepik	Eunseo So, Man Cheol Kim	Pierre Beaurepaire	
	Based on GTS Formal Model Research on Reliability Test Profile Method of Hard-software System	Resistance of Surface Coating Exposed to Thermal Load	Development of Preliminary Event Trees for Loss of Coolant Accident and Loss of Load Event in Autonomous Micro Modular Reactor	Bayesian Updating with Reduced Experimental Data	
12:30-12:50	Siqi Luo, Shaoping Wang, Jian Shi, Qing Guo	Francisco Brocal, Cristina González, Miguel Sebastián, Genserik Reniers, Nicola Paltrinieri	Sejin Baek, Gyunyoung Heo, Taewan Kim, Jonghyun Kim	Sergio Cantero-Chinchilla, Juan Chiachío, Manuel Chiachío	
	Integrated Availability Assessment of Redundant URT's Vehicle Control System by GSPN	Emerging risk management versus traditional risk: differences and challenges in the context of occupational health and safety	Introduction to DICE (Dynamic Integrated Consequence Evaluation) toolbox for checking operation coverability in NPPs	Optimal ultrasonic sensor configuration based on value of information	

MONDAY, 14:00-15:20,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M01 - SESSION 2	M12 - SESSION 2	M11 - SESSION 2	M06 - SESSION 2	M07 - SESSION 2
ROOM	**A320**	**E415**	**F342**	**B305**	**F142**
CHAIR(S)	Eivind Okstad	Pengfei Wei, Lingfei You	Edoardo Patelli	Elena Zaitseva	Phuc Do
TOPIC	Accident and Incident Modeling	Structural Reliability	Simulation for Safety and Reliability Analysis	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
14:00-14:20	**Peter Hughes,** Coen van Gulijk, Rawia El Rashidy	**Zequan Chen,** Guofa Li, Jialong He, Chuanhai Chen	**Christoph Rosebrock,** Marcin Hinz, Stefan Bracke	**Paulo Oliveira,** Idir Arab, Milto Hadjikyriakou	**Enrique López Droguett,** Philip Kobrich, Gabriel San Martín, Alejandro Ortiz Bernardin, Yonas Zewdu Ayele
	An interactive learning method to obtain safety information from free text	De-nesting optimization method for hybrid structural reliability analysis based on dimension reduction	Approach for the simulation of anode corrosion in electrolysis processes	Failure rate ordering with an application to parallel systems	Physics Based Deep Learning Model for Crack Propagation Prognostics
14:20-14:40	**Anna Bushinskaya,** Sviatoslav Timashev	**Pengfei Wei,** Jingwen Song, Marcos A. Valdebenito, Michael Beer	**Chen Qian,** Wu Changchun, Bu Yaran, et al.	**Nicolas Clavé,** Sophie Mercier Laurent Bordes Pierre-Joseph Cacheux	**Marlene Bruns,** Benedikt Hofmeister, Tanja Grießmann, Raimund Rolfes
	The Toll of Incidents, Accidents and Disasters on the Average Life Expectancy in Good Health	Efficient estimation of failure probability bounds based on advanced sampling methods	Delivery Reliability Assessment of Gas Pipeline Under Stochastic Demand Variations	OR03: A New Bayesian Estimator of Failure Rates to Deal with Heterogeneous Data from the OREDA Database	Comparative study of parameterizations for damage localization with finite element model updating
14:40-15:00	**Vladimir Avalos-Bravo,** Jaime Santos-Reyes, Blanca Barragan-Tognola	**Lingfei You,** Jianguo Zhang, Hao Zhai, Qiao Li	**Monalisa Dos Santos,** Beatriz Cunha, Rafael Santiago, Márcio Moura, Isis Lins	**Jin Yan,** Chuan Lv, Jiayu Chen, Chunhui Guo	**Matteo Davide,** Lorenzo Dalla Vedova, Pier Carlo Berri, Paolo Maggiore
	A Preliminary Analysis of Accident Data Caused by Clandestine Takes in Pemex Pipelines	A New Structural Reliability Analysis Method with Fuzzy Random Variables Based on Maximum Entropy Model	A Simulation-based Model for Series-parallel Priority Queuing Systems	A comprehensive allocation model of reliability and maintainability index	A Lumped Parameter High Fidelity EMA Model for Model-based Prognostics
15:00-15:20		**Alba Sofi,** Filippo Giunta, Giuseppe Muscolino	**Jae Yoon Yoo,** Jong Woon Kim	**Hua-Ming Qian,** Hong-Zhong Huang, Peng Huang, Tudi Huang	**Kamrul Islam Shahin,** Christophe Simon, Philippe Weber
		Reliability Function for the Interval Stress Process of Randomly Excited Structures	Evaluation on the Adequacy of Tram Operationprofile Using Simulation	Time-variant reliability analysis based on the approximate relationship between the outcrossing rate and failure rate	Estimating IOHMM Parameters to Compute Remaining Useful Life of System

SESSION	M13 - SESSION 2	T12 - SESSION 2	M09 - SESSION 2	M14 - SESSION 2	T07 - SESSION 2
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Yan-Feng Li	Francisco Brocal	Marina Roewekamp	Matthias Faes	Gunhild Birgitte Sætren
TOPIC	System Reliability	Occupational Safety	Risk Assessment	Uncertainty Analysis	Land Transportation
14:00-14:20	**Thorben Kaul,** Amelie Bender, Walter Sextro	**Saqib Mehmood,** Sikder Mohammad Tawhidu Hasan, Abdul Kaium, Shakeel Ahmed, Anders Schmidt Kristensen, Dewan Ahsan	**Jana Markova,** Miroslav Sykora, Milan Holicky, Klara Stastna	**Elmar Plischke**	**Jack Litherland,** Gareth Calvert, John Andrews, Andy Kirwan
	Digital Twin for Reliability Analysis During Design and Operation of Mechatronic Systems	Risk Assessment and Cost Benefit Analysis of Occupational Safety Intervention for Ready-made Garment Factories A case study of Bangladesh	Probabilistic Risk Assessment of Ageing Thermal Power Plants	The Cusunoro Curve: a Visual Tool for Global Sensitivity Analysis	Development of an Extended RAMS Framework for Railway Networks
14:20-14:40	**Fredy Kristjanpoller,** Monica Lopez-Campos, Pablo Viveros, Rodrigo Pascual, Vicente Gonzalez-Prida, Adolfo Crespo	**Lillian Stene,** Irene Eikemo	**Minhua Lee,** ChungKung Lo	**Gabriel Sarazin,** Jérôme Morio, Agnès Lagnoux, Mathieu Balesdent, Loïc Brevault	**Xianliang Ren,** Jiateng Yin, Tao Tang
	Wind Farms Reliability Modeling for Life Cycle Cost Analysis	Is whistle blowing a safety mechanism or a threat?	A Method to Calculating the FMEA IE Frequency by the System Fault Tree	Sensitivity analysis of risk assessment with respect to data-driven dependence modeling	Quantitative Analysis for Resilience-based Urban Rail Systems: A Hybrid Knowledge-Based and Data-driven Approach
14:40-15:00	**Jinhua Mi,** Michael Beer, Yan-Feng Li, Matteo Broggi, Yuhua Cheng	**T20 - SESSION 2** Agriculture and Aquaculture Systems **Marta Wincewicz-Bosy**	**Hao-Ti Hsu,** Ching-Han Chen, Ching-Tien Huang, Lo-Chung Kung	**Rasool Mehdizadeh,** Elio El Kahi, Michel Khouri, Olivier Deck, Pierre Rahme	**Elena Rogova,** Christian Nowak, Matthias Ramold, Udo Steininger
	Common Cause Failure Importance Analysis for Aerospace Systems	Analysis of a Model of the Network of Entities Comprising Horse Industry	The Risk Effectiveness of Installing RCP Shutdown Seal for Loss of CCW Event	Sensitivity analysis in the transmission of ground movements to structures considering the variability of soil-structure interaction parameters	Comparison of analytical formulas of PFH and PMHF calculation for M-out-of-N redundancy architecture
15:00-15:20	**Hugo Rosero-Velásquez**, Daniel Straub	**T10 - SESSION 2** Natural Hazards **Marie Nilsen,** Torgeir Haavik, Petter Almklov	**Martin Hassel,** Asbjørn Lein Aalberg, Haakon Nordkvist		
	Representative hazard scenarios for risk assessment of spatially distributed infrastructure systems	Social capital and disaster resilience	An Advanced Method for Detecting Exceptional Vessel Encounters in Open Waters from High Resolution AIS Data		

23.09. MONDAY, 15:40-17:20, 10 PARALLEL SESSIONS, 5 PAPERS PER SESSION

SESSION	M01 - SESSION 3	T09 - SESSION 3	M11 - SESSION 3	M06 - SESSION 3	M07 - SESSION 3
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Jacek Skorupski	Jin Wang	Matteo Broggi	Lesley Walls	Victor Krymsky
TOPIC	Accident and Incident Modeling	Maritime and Offshore Technology	Simulation for Safety and Reliability Analysis	Mathematical Methods in Reliability and	Prognostics and System Health Management
15:40-16:00	**Sooyong Park,** Jaewhan Kim, Jinkyun Park	**S. O. Johnsen,** S. S. Kilskar, B.E. Danielsen	**Xin Ren,** Karel Terwel, Igor Nikolic, Pieter van Gelder	**Peter Zeiler,** Aleksandar Eric	**Marc Hoenig,** Simon Hagmeyer, Peter Zeiler
	Uncertainty Analysis of the Effectiveness of Samg Strategy in Typical PWR	Improvements in Rules and Regulations to Support Sensemaking in Safety-critical Maritime Operations	An Agent-based Model to Evaluate Influences on Structural Reliability by Human and Organizational Factors	Confidence Interval of Reliability at Use Condition Considering the Comprehensive Statistical Uncertainty and Distribution of Constant Stress and Life-Stress Model	Enhancing Remaining Useful Lifetime Prediction by an Advanced Ensemble Method Adapted to the Specific Characteristics of Prognostics and Health Management
16:00-16:20	**Jaegab Kim,** Myungro Kim, HanSul Lee	**Sean Loughney,** Jin Wang, Dante Benjamin Matellini	**Fuyong Chen,** Wengang Zhang	**Arne Huseby,** Erik Vanem, Maria Hjelset Barbosa	**Enrique López-Droguett,** Andrés Ruiz-Tagle, Cristián Schaad, et al.
	The Effectiveness of Secondary Heat Removal during Drain operation in Mode 5 for Risk Reduction in Low Power Shutdown Level 1 PRA	Applying a Bayesian Network Methodology to an Offshore Gas Turbine Driven Power Generator to Demonstrate the Cause and Effect Relationship of the Turbine Running Over-speed and the Associated Switchboard Failures.	Probabilistic assessment on stability and serviceability of existing tunnel due to down-crossing shield tunnel	Environmental contours for mixtures of distributions	Recurrent Capsule Networks for Remaining Useful Life Prognostics
16:20-16:40	**Cristian Colombini,** Valentina Busini	**Soumya Bhattacharjya,** Swagato Majumder, Gaurav Datta	**Christoph Eckert,** Michael Beer, Stefan Weber	**Ping Jiang,** Bo Wang, Yunyan Xing, Zhaoli Song	**Marcin Hinz,** Dominik Brueggemann, Stefan Bracke
	High-Pressure Methane jet: Analysis of the Jet-Obstacle interaction	An Efficient Metamodelling Based Fragility Analysis Procedure of Offshore Structure Under Extreme Wave	Measuring Systemic Risk for Mechanical Structures using Conditional Probability	Reliability Evaluation by Accelerated testing with zero failure data	Comparison of Inductive Learning and Neural Networks in Condition Monitoring Systems of Complex Machines
16:40-17:00	**M09 - SESSION 3** Risk Assessment **Valery Lesnykh,** Tatiana Timoveeva	**Jan Erik Vinnem,** Ingrid B. Utne, Børge Rokseth, Asgeir J. Sørensen	**Chi Zhang,** Di Zhang, Mingyang Zhang, Wei Cao, Wengang Mao	**Zdenek Vintr,** Xuan Phong Cu	**Rui Li,** Wim J.C Verhagen, Richard Curran
	Problems of Economic Damage Assessment Caused by Power Supply Interruption on the Example of Gas Industry Objects	Online Risk Modelling for Supervisory Risk Control of Autonomous Marine Systems	A Ship Safe Speed Identifying Method from Risk Perspectives in Arctic Waters	Analysis of Accelerated Reliability Testing Data of Electronic Component in Combat Vehicles	Comparison of Data-driven Prognostics Models: A Process Perspective
17:00-17:20	**Alexander Bochkov,** Mikhail Lukyanchikov, Valery Lesnyk	**Lars Hurlen,** Ann Britt Skjerve, Andreas Bye	**Jörg Finger,** Georg Vogelbacher, Ivo Häring	**Effie Marcoulaki,** Christos Spyropoulos, Christos Psevdos	**Behzad Ghodrati**
	Problem of Creation of Integrated Index of Assessment of Production Safety Condition at Hazardous Production Facilities	Sensemaking in Safety-critical Situations. the Challenges Faced by Dynamic Positioning Operators	Towards Visibility and Audibility Algorithms for Assessing Perceived Safety and Security in Public Areas Based on Digital 3d City Models	Toxicity assessment for safe-by-design nanomaterials using advanced data analytics	Predictive Maintenance of Mining Machinery Using Machine Learning Approaches

SESSION	M13 - SESSION 3	T10 - SESSION 3	M18 - SESSION 3	M14 - SESSION 3	T03 - SESSION 3
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Wangji Yan	Marcos Valdebenito	Heinrich Mödden	Elmar Plischke	Chul-Woo Kim
TOPIC	System Reliability	Natural Hazards	Risk Analysis and Safety in Standardization	Uncertainty Analysis	Civil Engineering
15:40-16:00	**Yusheng Sun**, Lizhi Wang, Xiaohong Wang, et al.	**Marcelo Alencar**, Lucas da Silva, Júlia Humberto, et al.	**Volker Wittstock**, Patrick Puschmann, Adrian Albero, et al.	**Philipp Otto**	**Chul-Woo Kim**, Yoshinao Goi
	Reliability Assessment Method Based on Performance Degradation Data from Multi-axial Direction of Motor	Multicriteria Modelling for Managing Flood Risks in Urban Areas	Weak Point Analysis of Human Machine Interactions at Clamping of Turning Workpieces on Milling Machines	Modeling spatial dependence in local risks and uncertainties	Vibration-based Damage Detection of Steel Bridges Using Bayesian Hypothesis Testing
16:00-16:20	**Sebastian Klabes**, Marc Zeller	**Simon Berkhahn**, Robert Sämann, Bora Shehu, Insa Neuweiler, Uwe Haberlandt	**Kai Haberbosch**, Eckart Uhlmann, Simon Thom, Sophie Drieux, Alex Schwarze and Mitchel Polte	**Matthias Faes**, David Moens	**Haruka Yokoyama**, Masayuki Kohiyama, Hajime Iwai
	Iterative and Incremental Development of Reliable Systems	Uncertainty of real-time prediction for pluvial urban floods: a case study	Investigation on the Effect of Novel Cutting Fluids with Modified Ingredients Regarding the Long-Term Resistance of Polycarbonate Used as Machine Guards in Cutting Operations	Cross-dependence between interval fields in finite element models: definition and analysis	Phase Similarity Model Between Element Waves of Adjacent Element Faults for Simulated Ground Motion Based on the Stochastic Greenâs Function Method
16:20-16:40	**Abu Md Ariful Islam**, Himanshu Srivastav, Jørn Vatn, Anne Barros, Mary Ann Lundteigen	Alena Oulehlova	**Fabio Pera**, Luca Landi, Alessandro Stecconi, Ernesto Del Prete, Carlo Ratti	**Marius Bittner**, Matteo Broggi, Michael Beer	**Clemens Huebler**, Cristian Gebhardt, Raimund Rolfes
	Time-Dependent Unavailability Assessment of Final Element of Safety Instrumented Systems- an Application of Multi-Phase Markov Process	Comparison of the Assessment Results of the Municipality Area Vulnerability to Natural Disaster Risks	Influence of the penetrator shape on safety evaluation of machine tool guards.	Rare Event Modeling for Stochastic Dynamic Systems approximated by the Probability Density Evolution Method	Assessment of Sensitivity Analysis Methods of Different Complexity for Offshore Wind Turbines
16:40-17:00	**Karol Kowal**, Sławomir Potempski, Eryk Turski, Paweł M. Stano	**Takayuki Hayashi**, Harumi Yashiro	**Simon Thom**, Eckart Uhlmann, Enrico Barth, Thomas Pache and Lukas Prasol	**Dirk Proske**	**Bernt Leira**, Wei Chai, Chana Sinsabvarodom
	A general framework for integrated RAMI analysis of nuclear/non-nuclear facilities	Spatial Probabilistic Seismic Hazard Analysis in Consideration With Temporal Changes of Probabilities of Earthquake Occurrence	Safety of Slim Tool Extensions for Milling Operations	Comparison of Frequencies and Probabilities of Failure in Engineering Sciences	On Correlation and Underlying Physics
17:00-17:20	**Reza Aulia**, Henry Tan, Srinivas Sriramula	**Claudia Vivalda**, Vittorio Verda, Andrea Carpignano, Elisa Guelpa	**Aleksandar Jovanović**	**Miroslav Vořechovský**, Jan Mašek, Jan Eliáš	**Jesko Gerlach**, Ludger Lohaus, Michael Haist
	Dynamic reliability model for subsea pipeline risk assessment due to third party damage	Short term preventive risk analysis for forest fires emergency readiness	Managing Emerging Risks for Enhanced Resilience: Aligning approaches internationally	Dynamical model of repelling particles for construction of distance-based designs	Performance-based durability design of concrete structures under uncertainty

SESSION	M04 - SESSION 4	M12 - SESSION 4	M08 - SESSION 4	M06 - SESSION 4	M07 - SESSION 4
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Chiara Leva	Martin Krejsa, Subrata Chakraborty	Eric Rigaud	Massimiliano Giorgio	Enrique Lopez Droguett
TOPIC	Human Factors and Human Reliability	Structural Reliability	Resilience Engineering	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
9:40-10:00	Michael Montecalvo, Matthew Humberstone, Jing Xing	Martin Krejsa, Petr Janas, Vlastimil Krejsa	Maria Nogal, Daniel Honfi	Wen-Bin Chen, Xiao-Yang Li, Rui Kang, Yu-Qing Hu	Thorsten Neumann, Daniela Narezo Guzmán
	Role of Human Reliability Analysis in Post-Fukushima Risk-Informed Decision Making	Refinement of Probability of Failure Estimation in DOProC method	Resilience Assessment of the Traffic Network Luxembourg-Metz. The Power of Information	Integration Method of Multi-Source Accelerated Degradation Testing Data Considering Epistemic Uncertainties and Stress Dependency	Bayesian network design for fault diagnostics of railway switches
10:00-10:20	Salvatore Massaiu, Xuhong He	Subrata Chakraborty, Sounak Kabasi	Julian Salomon, Jasper Behrensdorf, Matteo Broggi, Stefan Weber, Michael Beer	Alexander Kremer, Bernd Bertsche	Matteo Davide Lorenzo Dalla Vedova, Pier Carlo Berri, Stefatno Re
	Nordic Nuclear Power Plantsâ™ Emergency Response Organizations and HRA considerations for Multi-Unit Accidents	An Efficient Moving Least Squares Based Response Surface Method for Reliability Analysis of Structures	Multi-Dimensional Resilience Decision-Making On A Multi-Stage High-Speed Axial Compressor	A New Approach for Parametrization of Multidimensional Lifetime Models	A Comparison of Bio-inspired Meta-heuristic Algorithms for Aircraft Actuator Prognostics
10:20-10:40	Awwal Arigi, Jonghyun Kim	Subrata Chakraborty, Atin Roy,	Beatrice Cassottana, Nazli Yonca Aydin, Loon Ching Tang	Quentin Chatenet, Mitra Fouladirad, Emmanuel Remy, Martin Gagnon, Laurent Tôn-Thât, Antoine Tahan	A.h.s Garmabaki, Stefan Indahl, Jan Laue, Stefan Marklund, Johan Odelius, Annelie Hedström, Adithy Thaduri, Uday Kumar
	A Human Reliability Analysis Method for Level-2 Multi-unit PSA: Challenges and Prospective Approach	Improved Support Vector Regression Based Metamodel for Reliability Analysis of Structure	A Quantitative Method to Identify Strategies for Enhancing the Resilience of Water Networks	On the performance of the maximum likelihood estimation method for gamma process	A Survay on Underground Pipelines and Railway Infrastructure at Cross Sections
10:40-11:00	Luca Podofillini, Vinh N. Dang	Xinshui Yu	Hiba Baroud, Jin-Zhu Yu	Mauricio Monsalve, Roberto Benavente, Alejandro Urrutia	Mariusz Zieja, Mariusz Ważny, Sławomir Stępień, Michał Jasztal
	An analysis of recent operational events involving errors of commission	Reliability analysis of straight bars with multiple sub-rectangles considered strength degradation	A Probabilistic Approach for Modeling the Resilience of Interdependent Power and Water Infrastructure Networks	Pitfalls Associated With Bayesian Model Averaging for Risk Assessments	The Probabilistic Methods for Predicting the Reliability of Aircraft Commutator Devices

SESSION	M13 - SESSION 4	M15 - SESSION 4	M09 - SESSION 4	M10 - SESSION 4	T07 - SESSION 4
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Carlos Guedes Soares	Mock Ralf Günter	Peter Burgherr	Marcelo Hazin	Pierre Dersin
TOPIC	System Reliability	Software Reliability and Safety	Risk Assessment	Risk Management	Land Transportation
9:40-10:00	**Linjie Shen,** Yugang Zhang, Bifeng Song	**Hendrik Schäbe,** Jens Braband	**Luca Galbusera,** Marianthi Theocharidou, Ainara Casajus-Valles, Montserrat Marin-Ferrer, Karmen Poljansek, Georgios Giannopoulos	**Sizarta Sarshar,** André Hauge, Rune Winther	**Gunhild Birgitte** Sætren, Jan Petter Wigum, Petter Helmersen Bogfjellmo
	Reliability Modeling of Aircraft Feel Simulator with Time-Varying Dependent Degradation Processes	The paradox of software errors and dangerous system failures caused by software	National Risk Assessments in the EU: reflections and recommendations	Towards Risk Informed BIM Models in Major Norwegian Transport Projects	A qualitative study of the rider training system for younger riders in powered two-wheelers (PTW) class AM146 and A1, and its effect on risk.
10:00-10:20	**He Li,** Carlos Guedes Soares	**Tor Stålhane,** Stig Ole Johnsen	**Ottone Scammacca,** Rasool Mehdizadeh Yann Gunzburger	**Eugen Nachtigall,** Carsten Janiec	**Gunhild Birgitte** Sætren, Toril Fagerli Birkeland, Pål Andreas Pedersen, Catharina Lindheim, Martin Rasmussen,
	Reliability Analysis of Floating Offshore Wind Turbines Support Structure using Hierarchical Bayesian Network	Software Errors and Human Reliability	An integrated methodology for risk management of mining projects at different spatial scales	Can Fire Prevention Officers Judge Structural and Technical Fire Protection Measures?	Opportunities and limitations in use of simulators in driver training. A qualitative study.
10:20-10:40	**M. R. Jalal,** M.F. Abdulhamid, H.S. Kang, A.S. Kader, M.N. Tamin, E. Lotovskyi	**Kim Bjorkman,** Antti Pakonen	**Kazuaki Torisawa,** Kei Horie, Masashi Matsuoka, Munenari Inoguchi, Fumio Yamazaki	**Andreas Ellingsgaard Baastrup,** Jennifer Elyse Lynette	**John Spouge**
	Stochastic Petri Nets Modeling for Reliability, Availability and Maintainability Study of a Power Generation Plant	Coupling Model Checking and PSA - a Case Study	Analysis of Building Damage in Uki City due to the 2016 Kumamoto Earthquake	Defining Parameters of Quality in Municipal Fire and Rescue Services - A Case Study in Denmark	Frequencies of Leaks of Dangerous Goods from Road Tankers
10:40-11:00	**Margaux Duroeulx,** Nicolae Brinzei, Marie Duflot, Stephan Merz	**Thor Myklebust,** Tor Stålhane, Geir K. Hanssen	**Nacim Yousfi,** Mahmoud Bensaibi	**Rodrigo Ferreira,** Felipe de Andrade, Carlos de Albuquerque, Marcelo Alencar, Ana Costa	
	Integrating satisfiability solving in the assessment of system reliability modeled by dynamic fault trees	Analyze first development when recertifying safety-critical software	Vulnerability Index Assessment of Overall Strengthened Masonry Buildings	Multicriteria Analysis for Strategic Risk Mitigation in the Federal Police of Brazil	

24.09. TUESDAY, 11:30-12:50,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M04 - SESSION 5	M12 - SESSION 5	M08 - SESSION 5	M06 - SESSION 5	M07 - SESSION 5
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Michael Montecalvo	Yuan Feng, Marcos Valdebenito	Eric Rigaud	John Andrews	Matteo Davide Lorenzo Dalla Vedova
TOPIC	Human Factors and Human Reliability	Structural Reliability	Resilience Engineering	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
11:30-11:50	**Caroline Morais,** Silvia Tolo, Raphael Moura, Michael Beer, Edoardo Patelli	**Jaebeom Lee,** Young-Joo Lee, Chang-Su Sim	**Lech Bukowski,** Paweł Sobczak	**Elena Zaitseva,** Miroslav Kvassay, Patrik Rusnak, Jozef Kostolny	**Costas Papadimitriou,** Tulay Ercan, Omid Sedehi, Lambros Katafygiotis
	Tackling the lack of data for human error probability with Credal network	Probabilistic Prediction of Ultimate Strength and Strain of Corroded Steel Strands	Resilience assessment of heterogeneous complex transport network - a general framework and a case study	Application of logic differential calculus and binary decision diagrams in detection of minimal cut vectors	Robust Optimal Sensor Placement for Response Reconstruction Using Output-only Vibration Measurements
11:50 12:10	**Gueorgui Petkov**	**Yuan Feng,** Wei Gao, Di Wu	**Yonas Zewdu Ayele,** Enrique Lopez Droguett	**Michael Todinov**	**Effie Marcoulaki,** Sarantis Kotsilitis, Emmanouil Kalligeros
	Pet Generative Data Models for HRA Data Mining	Stochastic Elastoplastic Plane Stress/Strain Analysis	Application of UAVs for Bridge Inspections and Resilience Assessment	A new domain-independent method for improving reliability and reducing risk based on algebraic inequalities	High frequency energy disaggregation sampling and analysis towards predictive maintenance applications
12:10-12:30	**Mei Ling Fam,** Xuhong He, Dimitrios Konovessis, Lin Seng Ong, Hoon Kiang Tan	**Mauricio Misraji,** Marcos Valdebenito, Franco Mayorga, Héctor Jensen	**Zehra Irem Turksezer,** Maria Pina Limongelli, Michael Havbro Faber	**Stefan Bracke,** Sebastian Sochacki	**Behzad Ghodrati,** Yazdi Mehdi Behzad, Behzad Ghodrati, Amir Taghizadeh Vahed
	Bayesian Aggregation Aethods of Expert Judgement to Incorporate Human Error Probabilities for Offshore Decommissioning Risk Assessment	Reliability Sensitivity Analysis for Linear Structures Subject to Dynamic Gaussian Excitation	System Identification in Resilience Management of Historical Bridges	Saturation Models to Assess Risk in Product Fleets During the Use Phase	Experimental study of roller bearing failure pattern based on vibration growth process
12:30-12:50	**Susana García-Herrero,** Rachel Aldred, Esther Anaya, Miguel Mariscal		**Trine Marie Stene**	**Chu Jiayun,** Zhao Tingdi, Jiao Jian	**Krzysztof Blacha,** Mariusz Wesołowski, Aleksandra Rumak
	Vulnerability of cyclists on the road. Probabilistic analysis of the database of traffic accidents in Spain		Safety When Implementing Digital Technology and Infrastructure	Risk Analysis and Trade-off Design Method Based on Dempster-Shafer Evidence Theory Oriented for Multi-Source Information System	Influence of the Load Bearing Capacity a Concrete Airfield Pavement Constructions on the Safety of Air Operations

24.09. TUESDAY, 11:30-12:50,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M13 - SESSION 5	M15 - SESSION 5	M09 - SESSION 5	M10 - SESSION 5	TC304
ROOM	**A310**	**F128**	**F442**	**F428**	**B302**
CHAIR(S)	Matteo Broggi	Ralf Günther Mock	Jan-Erik Vinnem	Lesley Walls	Kok-Kwang Phoon, Jianye Ching
TOPIC	System Reliability	Software Reliability and Safety	Risk Assessment	Risk Management	Geotechnical Risk, Reliability, and Rata Analytics
11:30-11:50	**Elisa Carlucci,** Leonardo Tognarelli	**Wei Lan,** Wang Ruili, Liu Xiqiang, Liu Yuxia	**Peter Burgherr,** Matteo Spada, Anna Kalinina, Laurent Vandepaer, Peter Lustenberger, Wansub Kim	**Des Hartford,** Ben Ale, David H. Slater	**Marcin Chwała**
	E-LNG Plant Availability Estimation	Application of Method of Manufactures Solutions in Code Verification	Comparative Risk Assessment of Accidents in the Energy Sector within Different Long-Term Scenarios and Marginal Electricity Supply Mixes	Variability: Threat or Curse	An efficient procedure for 3-D random bearing capacity evaluation
11:50 12:10	**Clemens Dubslaff,** Kai Ding, Andrey Morozov, Christel Baier, Klaus Janschek	**Sourav Sinha,** Neeraj Kumar Goyal, Rajib Mall	**Marko Čepin,** Maksim Demin, Maksim Danilov, Irina Romanenko, Vyacheslav Afanasyev	**J. González-Pérez,** Miguel Ángel Mariscal, Jose Gutierrez-Llorente, Susana García-Herrero, Khalid Azfar	**Wojciech Puła,** Marek Kawa, Andrzej Truty
	Breaking the Limits of Redundancy Systems Analysis	Early Prediction of Reliability/Availability of Embedded System Based on Conceptual Design	Power System Reliability Importance Measures	Risks Management and Cobots. Identifying Critical Variables.	Probabilistic analysis of a diaphragm wall in spatially variable soil
12:10-12:30	**Thomas Köttermann,** Stefan Bracke	**Hervé Mbonjo,** Ewgenij Piljugin	**Matteo Spada,** Peter Burgherr	**Pavel Krcal,** Ola Bäckström, Xuhong He, Johan Sörman, Wei Wang	**Mikhail Kholmyansky**
	Customer segments and their reliability characteristics generated from field operation and warranty data	Approach for evaluation of software failure modes in software-based I&C systems in nuclear power plants	A Hierarchical Approximate Bayesian Computation (HABC) for Accident Risk in the Energy Sector triggered by Natural Events	Risk Monitoring: a Comparison Across Risk Types and Application Domains	A simple approach to vibrational reliability of geotechnical systems
12:30-12:50	**Xin Zhang,** Ning Huang, Yanan Bai		**Mauricio Monsalve,** Juan Carlos de la Llera	**Thalles Garcez,** Marcelo Alencar	
	Fractal Characteristics of Complex Networks With Cascading Failures		Identifying Critical Components in Power Distribution Networks Using Graph Theoretical Measures	Multidimensional HAZOP analysis (MHAZOP): a comprehensive support to decision-making process in risk management	

SESSION	M04 - SESSION 6	M12 - SESSION 6	M08 - SESSION 6	M06 - SESSION 6	M07 - SESSION 6
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Jonghyun Kim	Pan Wang, Umberto Alibrandi	Eric Rigaud	Lisa Jackson	William Fauriat
TOPIC	Human Factors and Human Reliability	Structural Reliability	Resilience Engineering	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
14:00-14:20	**Shokoufeh Abrishami,** Nima Khakzad, Pieter van Gelder, Seyed Mahmoud Hosseini	**Zhenhao Zhang,** Yi Zeng, Xin Liu	**Franziska Roth,** Markus Deublein, Christian Willi, Kalliopi Anastassiadou, Ulrich Bergerhausen	**Liu Yang,** Antoine Rauzy, Mary Ann Lundteigen	**Ewa Laskowska,** Jørn Vatn
	Improving the performance of Success Likelihood Index Model (SLIM) using Bayesian network	Accurate Probabilistic Analysis on the Multiple Passages Problem of the Wiener Process	Linking science to practice: a pragmatic approach for the assessment of actions to improve the resilience	Finite Degradation Analysis of Multiple Safety Instrumented Systems	Diagnosis and prognosis of health state of valves used in power plants of oil and gas industry
14:20-14:40	**Fatmagul Ibisoglu,** Katrina M Groth	**Pan Wang,** Haihe Li	**Alena Oulehlova,** Pavel Kincl	**Laurent Cauffriez**	**Philipp Heß,** Stefan Bracke
	Methods for Dependency between Human Failure Events in Human Reliability Analysis: An Overview of the State-Of-The-Art	Copula-based numerical computation approach for the sensitivity of failure probability	Data Availability Assessment for the Usability of Disaster Resilience Scorecard for Cities in the Czech Republic	Review of Mathematical Inconsistencies in the Practices to Assess SIL of SIS : Toward a Novel Approach for Risk Reduction	Reliability and degradation analysis of smart material actuators
14:40-15:00	**Salvatore F. Greco,** Luca Podofillini, Vinh N. Dang	**Umberto Alibrandi,** Khalid M. Mosalam	**Dianka Zuiderwijk,** Kees Boersma	**Larissa Gaus,** Michael Schwarz, Josef Börcsök	**Aibo Zhang,** Yiliu Liu, Anne Barros, Elias Kassa
	Crew performance variability in simulator data for Human Reliability Analysis: investigation of modelling options	Information Theory for data-driven Risk Analysis: The informational coefficient of correlation as a measure of dependency	Operational reliability in complex temporary organizations	Estimation of optimal safety parameters for a communication channel with required SIL 3 at run time	A degrading element of safety-instrumented systems with combined maintenance strategy
15:00-15:20	**Beatriz Navas de Maya,** Rafet Kurt, Osman Turan		**Stefania D´Onofrio,** Giovanni Ranza	**Jing Xie,** Min Xie	**Amelie Bender,** Lennart Schinke, Walter Sextro
	Marine Accident Learning with Fuzzy Cognitive Maps (MALFCMs): A Case Study on Fishing Vessels		Engaging Stakeholders for Fostering Infrastructure and Community Resilence	Packet Delay Constraint Analysis of Safe Cooperating Cyber-Physical Systems (SafeCOP)	Remaining useful lifetime prediction based on adaptive failure thresholds

SESSION	M13 - SESSION 6	M05 - SESSION 6	M09 - SESSION 6	M14 - SESSION 6	TC304
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Giovanni Sansavini	Antoine Grall	Matteo Spada	Roger Flage	Kok-Kwang Phoon, Jianye Ching
TOPIC	System Reliability	Maintenance Modeling and Applications	Risk Assessment	Uncertainty Analysis	Geotechnical Risk, Reliability, and Rata Analytics
14:00-14:20	Matthias Rauschenbach, Jürgen Nuffer	João Mateus Marques de Santana, Rafael Velôzo Santiago, Márcio das Chagas Moura, Isis Didier Lins, Enrique López Droguett	Hendrik Schäbe	Tianpei Zu, Meilin Wen, Rui Kang, Qingyuan Zhang	Jianye Ching, Kok-Kwang Phoon
	Quantiative FMEA and Functional Safety Metrics Evaluation in Bayesian Networks	A Principal-agent Approach for Designing Maintenance Service Contracts	Verification and Assessment in Railway Safety	Belief reliability evaluation with uncertain information using max entropy principle	Characterization of scale of fluctuation and sample path smoothness
14:20-14:40	Wensheng Peng, Zhaoyang Zeng, Zhanyong Ren	J. Sobral, C. Guedes Soares	Kunling Song, Yugang Zhang, Xinshui Yu, Bifeng Song	Ali Mahnashi, Tahani Coolen-Maturi, Frank Coolen	Mika Knuuti, Tim Länsivaara
	An energy flow based uncertainty network modeling method for mechatronic system reliability analysis	Offshore Wind Farms Maintenance Strategy Using the Analytic Network Process	An Adaptive Sequential Sampling Method for Reliability Analysis and Its Application in Aircraft Cabin Door Lock Mechanism	Generalizing Nonparametric Predictive Inference for Right-Censored Data to Two Future Observations	Variation in CPTu data Finnish soft soils
14:40-15:00	Daniel Straub, Kilian Zwirglmaier	Sebastian Sochacki, Fabian Reinecke, Stefan Bracke	Agnieszka Anna Tubis	Abdullah Ahmadini, Frank Coolen	Marco Uzielli, Marco Zei, Johann Facciorusso, Claudia Madiai
	Hybrid Bayesian Network Algorithm Based on MMCM and Subset Simulation for Reliability Analysis	Dynamic Adaption of Maintenance Packages within the Product Use-phase Using uMachine Learning Methods regarding Operating Data	Method of 3-dimensional Decision Space in the Risk Assessment Process in Road Transport	Nonparametric Predictive Inference for Warranties Based on Accelerated Life Test Data	Probabilistic estimation of linear and volumetric strain thresholds for Italian clays
15:00-15:20	Lechang Yang, Yanling Guo, Qiang Wang, Zifan Kong	Athanasios Kolios, Julia Walgern, Sofia Koukoura, Ravi Pandit, Juan Chiachio-Ruano	Tetsuo Yamada, Shota Hasegawa, Stefan Bracke	Elena Stefana, Filippo Marciano, Paola Cocca	Kok-Kwang Phoon, Yelu Zhou, Dongming Zhang, Hongwei Huang
	Reliability assessment of a complex system with unspecified structure and overlapping test data	openO&M: Robust O&M open access tool for improving operation and maintenance of offshore wind turbines	Life Cycle Option Selection of Disassembly Part for Recovery Rate and Cost Considering Reliability	Uncertainty and Sensitivity Analyses of Models for Assessing Oxygen Deficiency Hazard: Preliminary Results	Multivariate Probability Distribution of Shanghai Clay Properties

SESSION	M04 - SESSION 7	T09 - SESSION 7	M11 - SESSION 7	M06 - SESSION 7	T11 - SESSION 7
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Luca Podofillini	Sean Loughney	Pengfei Wei	Christian Tanguy	Gyunyoung Heo
TOPIC	Human Factors and Human Reliability	Maritime and Offshore Technology	Simulation for Safety and Reliability Analysis	Mathematical Methods in Reliability and Safety	Nuclear Industry
15:40-16:00	**Rossella Bisio,** Andreas Bye, Lars Hurlen	**Claudia Vivalda,** Claudia Iurato	**Yuan Chen,** Peng Zhang, Wei Su, et al.	**Radim Bris,** Tien Thanh Thach	**Mark James Wootton,** John Andrews, Adam Lloyd, et al.
	Human Machine Interface for Supporting Sensemaking in Critical Situations, a Literature Review	A Practical Method for Generating Stochastic Release Scenarios for Smart Gas Sensing	Failure Mechanism Analysis on Copper-Filled TSV Interposer Based On Transient Thermal Mechanical Stress Simulation	Reparameterized Weibull Distribution: a Bayes Study Using Hamiltonian Monte Carlo	Petri Nets and Pseudo-Bond Graphs for a Nuclear Reactor Primary Coolant System
16:00-16:20	**Espen Nystad,** Magnhild Kaarstad, Robert McDonald	**Sebastian Imle,** Tobias Winter	**Ye Wang,** Guicui Fu	**Songhua Hao,** Jun Yang, Christophe Berenguer	**Daeil Lee,** Jonghyun Kim
	Crew Decision-Making in Situations with Degraded Information	Safety and Reliability Analysis of an Actuation System	Solder Layer Voids Failure Criteria of Insulated Gate Bipolar Transistor Modules Based on Thermal Network Model	A Perturbed Inverse Gaussian Process Model With Time Varying Variance-to-mean Ratio	Optimal Autonomous Operation for Power Control of Nuclear Power Plants by using Deep Reinforcement Learning
16:20-16:40	**Espen Nystad,** Magnhild Kaarstad	**Sovanna Chhoeung,** Tim Wüllner, Axel Hahn	**Johannes Heinrich,** Julian-Steffen Mueller, Fabian Plinke, Timo Frederik, Horeis Hendrik Decke	**Massimiliano Giorgio,** Fabio Postiglione, Gianpaolo Pulcini	**Yujeong Hwang,** Gyunyoung Heo
	Impact of Degraded Process Information on Operator Trust	Classification Heuristic for Selecting a Suitable Idealized Wave Spectrum Based on Excited Ship Motions and Current Weather	State-based availability analysis of hard- and software-architectures using Monte Carlo Simulation under consideration of different failure modes and degradation models	A Bayesian Estimation Approach for the Age and State-dependent Transformed Wiener Degradation Process	Agent-based Modeling to Integrate Dispersion Phenomena and Evacuation Options in Radiological Accidents
16:40-17:00	**Yochan Kim,** Jinkyun Park	**Tobias Winter,** Markus Glaser	**Giovanni Sansavini,** Blazhe Gjorgiev, Li Bing	**Léa Brenière,** Laurent Doyen, Christophe Bérenguer	**Lesley Walls,** Euan Barlow, Emma Comrie, Matthew Revie, Tim Bedford
	A Framework of HRA for Computer-Based Control Room	Empirical Reliability Analysis of a Safe Subsea Battery	Calibration of Cascading Failure Simulation Models for Power System Risk Assessment	Simulation and Parameter Estimation for Virtual Age Models With Time-dependent Covariates: Methodology and Performance Evaluation	Decision Support Model for Annular Spacer Repositioning
17:00-17:20	**Yochan Kim**	**Zaili Yang,** Chenpeng Wan, Xinping Yan, Di Zhang, et al.	**Marius Héry,** Abla M. Edjossan-Sossou, Olivier Deck, et a.	**Mahesh Kumar,** P.C. Ramyamol	**Günter Becker,** Alexios Camarinopoulos, Stephan Kranz, et al.
	Expert Elicitation for Estimating PSF Effects on Heps in Computer-Based Control Rooms	A Risk-based Method for Analyzing the Resilience of Maritime Container Shipping Networks	Probabilistic model of building evacuation during a flood	Reliability Acceptance Sampling Plan for Weighted Exponential Distribution Based on Constant Stress Accelerated Data	Uncertainty Assessment of Seismic Fragilities - a Modification of the Kennedy Ravindra Approach

TUESDAY, 15:40-17:20,
10 PARALLEL SESSIONS, 5 PAPERS PER SESSION

SESSION	T01 - SESSION 7	M05 - SESSION 7	M18 - SESSION 7	M14 - SESSION 7	T03 - SESSION 7
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Sifeng Bi, Pan Wang	David Valis	Simon Thom, Fabio Pera	Rodolfo M.N. Fleury	Vladik Kreinovich
TOPIC	Aeronautics and Aerospace	Maintenance Modeling and Applications	Risk Analysis and Safety in Standardization	Uncertainty Analysis	Civil Engineering
15:40-16:00	Jacek Skorupski, Beata Płanda	Ashish Keshkamat, Jan Hauschild, Hendrik Meyer	Jon T. Selvik, Jean-Pierre Signoret, Francisco Alhanati	Luis Crespo, Sean Kenny, Brendon Colbert, Daniel Giesy	Vladik Kreinovich, Olga Kosheleva, Yan Wang
	Analysis of Uncertainty as a Factor Influencing the Aircraft Boarding Process Reliability	Monte Carlo simulation of a reliability optimized maintenance concept for systems with limited accessibility	Use of different time periods on MTTF estimation - discussion on the need for improved guidance in reliability standards	Density Estimation and Data-Enclosing Sets using Sliced-Normal Distributions	Computational Complexity of Experiment Design in Civil Engineering
16:00-16:20	Rentong Chen, Shaoping Wang, Chao Zhang, Mileta Tomovic	Tran Minh Hao LA, Khac Tuan Huynh, Antoine Grall, Yves Langeron	Heinrich Mödden	Mona M. Dannert, Rodolfo M.N. Fleury, Amelie Fau, Udo Nackenhorst	Hiroki Yokoyama, Masayuki Kohiyama
	Reliability estimation for reciprocating seals of aircraft actuators under segmental stress history	Degradation Modeling and Condition-Based Maintenance Decision-Making for Dynamic System in S-plane	Probabilities in Safety of Machinery: 1. Markov Model for Risk Comparison	Non-linear finite element analysis under mixed epistemic and aleatory uncertain random field input	Probability Distribution of Torsional Response Induced by Lateral Displacement and Inertial Force
16:20-16:40	Mariusz Zieja, Mirosław Zieja, Piotr Migus, Jarosław Wójcik	Frank Müller, Bernd Bertsche	Heinrich Mödden	Franco Mayorga, Danko Jerez, Hector Jensen, Marcos Valdebenito	Mariusz Maslak
	A method for estimation and prediction of the efficiency of proactive prevention applied in aircraft transport	Simulation and Analysis of Simple, Repairable Systems with a Confidence Interval	Probabilities in Safety of Machinery: 2. Risk Reduction Effects with Special Operating Modes	The Use of Parametric Reduced-order Models in Stochastic Structural Dynamics: Application to Uncertainty Propagation Analysis	Probability-based Remaining Service Time Prediction for Corroded Shell of a Steel Tank Used for Liquid Fuel Storage
16:40-17:00	Jiaoying Huang, Cheng Gao, Chengcheng Fu, Mingjie Zhang	Isabel Marton, Sebastian Martorell, Pablo Martorell, Sofia Carlos, Ana Sanchez	Nanda Zikrullah, Meine van der Meulen, HyungJu Kim, Mary Lundteigen	Zhiqiang Wan, Jianbing Chen, Jie Li, Michael Beer	F. Niklas Schietzold, Wolfgang Graf, Michael Kaliske
	Neutron Induced SEU Rate Prediction of SRAMs by Using Support Vector Machine and Neural Network	Effect of the Obsolescence Management in RAM+C Models	Clarifying Implementation of Safe Design Principles in IEC 61508: Challenges of Novel Subsea Technology Development	A PDEM-COM Framework for Quantification of Epistemic Uncertainty	Optimization of Tree Trunk Axes Locations in Polymorphic Uncertain Modeled Timber Structures
17:00-17:20	Stéphane Bailly, Nathalie Verite	Dongyi Wang, Yanlei Wang, Xiaojun Zhang, Hongwei Cheng		Hongpan Niu, Ke Xie, Zhigeng Fan, Xinen Liu, Shifu Xiao	Panagiotis Spyridis, Mustafa Guevenc
	Management of Single Event Effects in helicopters avionic	Research of Condition-Based Maintenance Strategy Based on Simulation		SMUQ: an Uncertainty Quantification Software for Mechanical Performance Evaluation of Engineering Structures	Redundancy in Truss Systems - Influence of Structural Joint Performance

25.09. WEDNESDAY, 9:40-11:00, 10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M04 - SESSION 8	M12 - SESSION 8	M08 - SESSION 8	M06 - SESSION 8	M07 - SESSION 8
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Salvatore Massaiu	Yongbo Peng, Grace Wang	Trond Kongsvik	John Andrews	Zhiguo Zeng
TOPIC	Human Factors and Human Reliability	Structural Reliability	Resilience Engineering	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
9:40-10:00	Tiantian Zhu, Stein Haugen, Yiliu Liu	Yongbo Peng, Zhenkai Zhang	Mark Sujan, Dominic Furniss, Janet Anderson, Jeffrey Braithwaite, Erik Hollnagel	Pierre Dersin, René Valenzuela, Carole Saint-Ellier	William Fauriat, Enrico Zio
	Human factor challenges and possible solutions for the operation of highly autonomous ships	Reliability Based Integrated Optimization of MR Dampers for Semiactive Control of Randomly Base-Excited Structure	Towards a Syllabus for Resilient Health Care	New Method for Reliability Demonstration Test	Estimation of the value of prognostic information for condition-based and predictive maintenance
10:00-10:20	Soheila Sheikh Bahaei, Barbara Gallina	Grace Wang, Fu-Kuo Huang	Sina Øyri, Siri Wiig	Emanuele Pascale, Laurent Bouillaut, Cristian Maiorano, Raffaele Sista, Paolo Sannino, Pietro Marmo	Victor Krymsky
	Augmented reality-extended humans: towards a taxonomy of failures - focus on visual technologies	Fragility Analysis of a Real Building	Are regulatory systems facilitating resilience? A literature review	An alternative detection of safety and reliability weakness for safety-critical electronic railway signaling systems	Software Failure Prognostics on the Basis of Testing Results: Application of Imprecise Test Coverage Models
10:20-10:40	Gabriele Baldissone, Micaela Demichela, Chiara Leva, Salvina Murè	Sangmok Lee, Young-Joo Lee, Do-Soo Moon	Mirjam Fehling-Kaschek, Katja Faist, Jörg Finger, Ivo Häring, et al.	Jarosław Łukasiak, Adam Rosiński, Jacek Paś, Marek Szulim	Phuc DO, Christophe Berenguer, Emanuele Borgonovo
	Risk based approach for procedures optimization	A new hybrid method for seismic fragility analysis of reinforced concrete buildings	Risk and Resilience Assessment and Improvement in the Telecommunication Industry	Determination of Safety Levels of Electronic Devices Exposed to Impact of Strong Electromagnetic Pulses	Remaining useful life-based importance measures
10:40-11:00	Marija Bertrovic	Li Peipei, Zhao Yangang, Lu Zhaohui	Ralf Mock, Bernhard Hulin, Alexey Leksin	Petteri Ojala, Jari Rämö, Ilpo Nieminen, Juha Miettinen	Akash Basia, Zineb Simeu-Abazi, Eric Gascard, Peggy Zwolinski
	Human-related Risks in the Non-destructive Testing (NDT) of Hollow Railway Axles: Implications for the Education and Training of the NDT Personnel	Bayesian Model Updating Using Method of Moments With Application to Structural Reliability Assessment	An Ontology of Risk Associated Concepts in the Context of Resilience	Modeling of degradation of electric connector under varying humidity conditions	First step towards the development of a Prognosis Health Management (PHM) System for Li-ion batteries: An FMMEA based approach

25.09. WEDNESDAY, 9:40-11:00,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M13 - SESSION 8	M05 - SESSION 8	M09 - SESSION 8	M10 - SESSION 8	T03 - SESSION 8
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Edoardo Patelli	Christophe Berenguer	Jana Markova	Marcin Hinz	Marcos Valdebenito
TOPIC	System Reliability	Maintenance Modeling and Applications	Risk Assessment	Risk Management	Civil Engineering
9:40-10:00	Adriana Miralles Schleder, Victor Rafael Lima Souza-Franco, Maria Valentina Clavijo, et al.	Tianyi Wu, Yu Zhao, Xiaobing Ma	Maria Aranzazu Aznarez-Salvatierra, Nicola Zaccarelli, Nuria Rodriguez-Gomez, Ricardo Bolado-Lavin	Matthew Newall, Coen van Gulijk	Ruohan Wang, Yong Liu, Manyu Wang
	Monte Carlo Simulation to consider uncertainty in the reliability analysis of Dynamic Positioning Systems	An Extension of the Rolling Horizon Approach Incorporating the Opportunistic Maintenance for Multi-component Systems	A Risk Assessment Methodology for National Gas Systems. Application Example.	Real-Time Queries on Large Volumes of Safety Text	Seepage Evaluation in Tunnel Construction Considering the Spatial Variability of Surrounding Soils
10:00-10:20	Laurent Saintis, Bruno Castanier, Abdessamad Kobi, Fabrice Guérin, Marion Mélot, Grégory Mingot, Marc Grimmé, Christophe Blanchon, Pascal Dubuis	Mengyu Du, Yan-Fu Li	Francois Marie Nyobeu Fangue, Andreas Panenka	Maria Francesca Milazzo, Paolo Bragatto, Giuseppe Scionti	Kaiqi Li, Yong Liu, Peitao Li
	The Application of Reliability allocation methodology, from preliminary test data, to design a Definitive test plan. Application to Mechanical Heart Replacement Technology	Nonperiodic Maintenance Activities Scheduling for Pumps in Nuclear Power Plant Subsystem	Fuzzy Risk Evaluation in Failure Mode and Effects Analysis: A Risk-Based Approach for ranking Infrastructure Assets for Maintenance Interventions	Estimation of the Equipment Residual Lifetime in Major Hazard Industries by Using a Virtual Sensor	Artificial Ground Freezing Technique in Tunnel Construction Considering Uncertain Drilling Inaccuracy of Freeze Pipes
10:20-10:40	Silke Holtmanns, Ian Oliver, Hannu Hietalahti	Tomás Grubessich, Raúl Stegmaier, Pablo Viveros, Fredy Kristjanpoller	Riad Chemali, Blaise Conrard, Mireille Bayart	Jingwen Song, Zhenzhou Lu, Michael Beer	Elham Mahmoudi, Markus König
	Information Access in Disaster Areas	Design of weekly maintenance schedule for a fleet of trains for the achievement of organizational requirements	ICVSS: A New Methodology for Scoring Industrial Control Systems Vulnerabilities	Components importance ranking considering the effect of epistemic uncertainty	Reliability-based Robust Design Optimization of a Rock Salt Cavern
10:40-11:00	Ian Oliver, Gabriela Limonta	Juan Izquierdo, Adolfo Crespo, Jone Uribetxebarria, Asier Erguido	Shamsudeen Hassan, Jin Wang, Musa Bashir, Christos Kontovas	Royce Francis, Domenico Amodeo	Niklas Drews, Jürgen Stamm, Markus Nieren
	Analyzing Trust Failures in Safety Critical Systems	Comprehensive clustering approach for managing maintenance in a large fleet of assets	Application of Bayesian Model for Third Party Damage Assessment of Cross-country Oil Pipeline Under Uncertainty	An Introduction to Protocol Driven Resilience	Comparative Analysis of the Safety Level of River Levees Taking Uncertain Geotechnical Parameters into Account

25.09. WEDNESDAY, 11:30-12:50, 10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M04 - SESSION 9	M12 - SESSION 9	T15 - SESSION 9	M06 - SESSION 9	M07 - SESSION 9
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Oliver Straeter	Jana Markova, Yves Bohal	Mock Ralf Günter	Nicolae Brinzei	Zhiguo Zeng
TOPIC	Human Factors and Human Reliability	Structural Reliability	Cyber Physical Systems	Mathematical Methods in Reliability and Safety	Prognostics and System Health Management
11:30-11:50	**Oliver Straeter**	**Jana Markova,** Miroslav Sykora, Katerina Kreislova, Hana Geiplova	**Jan Prochazka,** Petr Novobilsky, Dana Prochazková	**Anna Borucka**	**Mariusz Wesołowski,** Paweł Pietruszewski, Paweł Iwanowski
	Is the Human a Risk Factor or a Risk Reducer? Answers based on the Challenges in Human Reliability Assessment	Reliability Assessment of Bridges based on Monitoring	Cyber Security of Urban Guided Transport Management according to MILS Principles	Empirical Analysis of Transportation System Using the Semi-Markov Process	Analysis of Natural Airfield Pavement's Load Capacity in the Aspect of Flight Operations Safety
11:50 12:10	**Tim Trostmann,** Christian Kern, Lena Blackert, Robert Refflinghaus	**Yasothorn Sapsathiarn,** Thanyawut Wansuwan	**Francesco Di Maio,** Roberto Mascherona, Wei Wang, Enrico Zio	**Susannah Naybour,** John Andrews, Manuel Chiachio-Ruano	**Mariusz Wesołowski,** Agata Kowalewska, Danuta Kowalska
	Quality Improvement in Manual Assembly by Software-based Evaluation of Human Misconduct	Mechanistic Model for Dynamic Soil-structure Interaction and Natural Frequency Assessment of Monopile Offshore Wind Turbine Structures	Simulation-based Goal Tree Success Tree Approach to the Risk Analysis of Cyber-Physical Systems	Efficient Risk Based Optimization of Large System Models using a Reduced Petri Net Methodology	Geocell Reinforcement in Natural Airfield Pavement Structure in the Aspect of the Safety of Conducted Flight Operations
12:10-12:30	**Maria Chiara Leva,** Lorenzo Comberti, Micaela Demichela, Alberto Caimo	**Yves Bohal,** Elio El Kahi, Vu Hung, Rasool Mehdizadeh, Olivier Deck, Michel Khouri, Pierre Rahme	**Nelson H. Carreras Guzman,** D. Kwame Minde Kufoalor, Igor Kozine, Mary Ann Lundteigen	**Christian Tanguy,** Marc Buret, Nicolae Brinzei	**T14 - SESSION 9**
					Oil and Gas Industry
					Sviatoslav Timashev, Olga Burukhina, Anna Bushinskaya
	Human performance in manufacturing tasks: optimization and assessment of required workload and capabilities	Influence of equivalent stiffness on the behavior of buildings subjected to soil settlements	Combined safety and security risk analysis using the UFOI-E method: A case study of an autonomous surface vessel	Is it safe to use MTTF/ (MTTF + MTTR) for the availability?	Reliability Assessment of Above-ground Arctic Oil Pipelines Subjected to Random Subsidence/upheaval of Its Supports
12:30-12:50	**Dominic Furniss,** Mark Sujan, Jamie Henderson, David Embrey		**Marc Bouissou,** Thuy Nguyen		**Paulo Soares,** Isis Lins, Márcio Moura, Caio Maior, Enrique Droguett
	What makes Human Factors Critical Task Reviews flourish or stall? Exploring performance variability using FRAM		Early Integration of Dependability Studies in the Design of Cyber Physical Systems		Virtual Reality to Improve the Emergency Team Preparation in an Oil Refinery

**25.09. WEDNESDAY, 11:30-12:50,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION**

SESSION	M13 - SESSION 9	M05 - SESSION 9	M09 - SESSION 9	M10 - SESSION 9	T03 - SESSION 9
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Frank Coolen	Bruno Castanier	Matteo Spada	Marcelo Hazin	Kok-Kwang Phoon
TOPIC	System Reliability	Maintenance Modeling and Applications	Risk Assessment	Risk Management	Civil Engineering
11:30-11:50	Yawar Abbas, Mohammad Rajabalinejad	Jack Litherland, John Andrews	Jan-Erik Vinnem, Silje Budde	Mahmood Shafiee, Isaac Animah, Augustus Addy-Lamptey	Elio El Kahi, Olivier Deck, Michel Khouri, Rasool Mehdizadeh, Pierre Rahme, Marianne Conin
	Adequate Tacit Knowledge Management for Railways: a Conceptual Framework	A Petri Net Methodology for Modelling the Maintenance of Railway Route Sections	Challenges for risk on future autonomous offshore installations	Risk Analysis for Liquefied Natural Gas (LNG) Assets	Influence of Spatial Variability of Soil Properties on Structures Response
11:50-12:10	Huichao Liu, Wei Wang	Rasoli Zabihullah, Kazutoshi Nagata, Takeshi Kitahara	Céline Vinuesa, Cyrille Folleau, Frédéric Doux, Stéphane Collas	Thalles Garcez, Pablo Andrade	Diego López Mulero, Ove Njå
	Research on Technical Framework of Helicopter Transmission System Reliability	Corrosion Environment on Steel Bridges Using Inverse Distance Weighting Method	New frequencies assessment method for safety analysis	Optimizing response plans in multidimensional risk management: a numerical application in a methanol production plant	Contrasting Safety Management Approaches for Natural Disasters Applied to Landslides in Sandnes (Norway)
12:10-12:30	Daniel Krpelik, Frank Coolen, Louis Aslett	Nour Chahrour, Sleiman Hariri, Jean-Marc Tacnet, Christophe Berenguer	Jacek Malinowski	Pablo Viveros, Vicente González-Prida, Jesús Zamora Bonilla, Antonio Guillén López, Antonio De La Fuente, Pablo Martínez-Galán, Eduardo Candón, Pedro Moreu de Leon	Yanan Ding, Yong Liu, Guan Chen
	A decomposition approach for computation of survival signatures of heterogeneous systems	A modeling framework for efficacy assessment and preventive maintenance of torrential protection works	A model of cascading failures in a distributed industrial environment	Understanding the New Context of Uncertainty and Risk Under the 4th Industry Revolution	Quantitative Risk Assessmemt on Landslides Considering Spatial Variability of Soils
12:30-12:50	Mariusz Zieja, Mariusz Ważny, Michał Jasztal, Sławomir Stępień	Renny Arismendi, Anne Barros, Jørn Vatn, Antoine Grall		Thalles V. Garcez, Danielle C. Morais, Tomasz Wachowicz, Adiel T. de Almeida	
	Estimation of Reliability for Aircraft Systems as Regards the Impact of Destructive Ageing Processes	Prognosis and Maintenance Optimization in Bridge Management		Multiple decision-makers in multidimensional risk analysis: a structured decision-making process	

25.09. WEDNESDAY, 14:00-15:20, 10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M04 - SESSION 10	M12 - SESSION 10	T13 - SESSION 10	M06 - SESSION 10	T14 - SESSION 10
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Raphael Moura	Petr Koudelka	Sissel H. Jore	Christian Tanguy	Marcelo Ramos Martins
TOPIC	Human Factors and Human Reliability	Structural Reliability	Security & Cyber Security	Mathematical Methods in Reliability and Safety	Oil and Gas Industry
14:00-14:20	Brett Molesworth, Marion Burgess, Annie Zhou	Petr Koudelka	Petr Hlavizna, Alena Oulehlova	Kamila Hasilova, David Valis	Live Fornes, Nathaniel John Edwin, Knut Øien
	The Prolonged Effect of in-cabin Aircraft Noise on Recognition Memory	Similarity characteristics of soils - A step towards structural reliability	Risk Assessment of the Development of Electronic Warfare Capabilities	Water distribution system reliability assessment based on nonparametric approach	Improved Safety in the Arctic through Digitalisation
14:20-14:40	Stephen Caffrey, Laís Lara, Christopher Murtagh, Maria Leva, Victor Hrymak	Lorenzo Sauer, Louis Robert, Ottone Scammacca, Rasool Mehdizadeh, Yann Gunzburger	Ted Stewart	Edith Grall-Maë, Pierre Beauseroy	Everton Lima, Ruben Benites, Ali Mosleh, Marcelo Martins
	Task based risk assessment for Human factors impact on Aviation Maintenance deviations: a case study on three specific tasks and their operational implications	Development of a method to assess the susceptibility of tailings dams' failure due to overtopping	Can we really prevent security vulnerabilities at the source?	A probabilistic model to maximize joint power detection of a group of trained detectors.	A Methodology to Use Multi-objective Optimization Criteria for an Offshore Topside Production System Since the Early Design Stages, and for the Unit Life Cycle
14:40-15:00	Alaide Bayma, Marcelo Ramos Martins	M. N. Tamin, M. F. Abdulhamid, M. Kamarudin, H. S. Kang, A. S. Kader, S. Ahmad, S. Badshah	Vikash Katta, Fabien Sechi, Per-Arne Jørgensen, Per Axel Wiig, John Eidar Simensen, Bjørn Axel Gran, Siv Hilde Houmb	Alexey Zhirabok, Alexander Zuev, Alexey Shumsky	Arantxa Aznárez, Cintia Hartmann, Nicola Zaccarelli, Hugo Calisto, Nuria Rodríguez-Gómez, Ricardo Bolado Lavín
	Human Reliability Analysis in the Aircraft Jacking Procedure	Numerical Framework for Fatigue Life Prediction of Steel Wire Ropes Employing Damage-based Failure Models	Establishing a Cybersecurity Centre for Industrial Control Systems	Fault Tolerant Control Using Sliding Mode Observers	Estimation of the Multivariate Distribution of Flows-Pressures to Supply a Gas Network
15:00-15:20	Konstantinos Kirytopoulos, Maria-Olympia Zeeri, Panagiotis Ntzeremes	Li-Xiang Cheng, Yan-Gang Zhao	Ana Llopis Alvarez, Ove Njå	Yanghongsheng Zhou, Jiazhen Feng, Kaiwei Wang, He Xie, Xuekong Wang, Weihan Wang, Dong Wu	Frank Børre Pedersen, Andreas Hafver, Luiz Fernando Oliveira
	Exploring road tunnel drivers behavior: The case of Greece	A Structural Reliability Analysis Method Based on Information Exchange Krill herd Algorithm	Approching Societal Safety from the Urban Perspective	Active Learning Kriging-Mixed Optimization Method for Hybrid Time-variant Reliability Analysis with Random and Interval Variables	Optimal Scheduling of Tests of Safety Systems, Considering Test-induced Degradation

25.09. WEDNESDAY, 14:00-15:20, 10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M13 - SESSION 10	M05 - SESSION 10	M09 - SESSION 10	M10 - SESSION 10	T22 - SESSION 10
ROOM	**A310**	**F128**	**F442**	**F428**	**B302**
CHAIR(S)	Frank Coolen	Matteo Broggi	Jana Markova	Hiba Baroud	Eirik Bjorheim Abrahamsen
TOPIC	System Reliability	Maintenance Modeling and Applications	Risk Assessment	Risk Management	Insurance, Banking and Finance
14:00-14:20	**Mariusz Zieja,** Józef Żurek, Jarosław Ziółkowski, Anna Borucka	**Mohamed Latrous,** Amélie Ponchet-Durupt, Nassim Boudaoud, Magali Bosch-Mauchand, Zohra Cherfi-Boulanger	**Daniel Lichte,** Kai-Dietrich Wolf	**Bjørn Gran,** Grete Rindahl, Sizarta Sarshar	**Sviatoslav Timashev,** Anna Bushinskaya
	Vehicle Operation Process Analysis Using the Markov Processes	Integrated decision rules for adaptive condition based maintenance and multivariate control charts	Bayesian Network Based Analysis of Cyber Security Impact on Safety	Design including RAMS and security for new Traffic Control Centers for the Norwegian Railway	Assessment of Residual Lifetime Based on the Gompertz-Makeham Law and Its Application to Insurance
14:20-14:40	**Jozef Zurek,** Andrzej Słodownik, Mirosław Kowalski	**Pablo Viveros,** Rodrigo Mena, Fredy Kristjanpoller, Erich Stowhas, Tomas Grubessich, Vicente Gonzalez-Prida, Christopher Nikulin	**Henrik Langdalen,** Eirik Bjorheim Abrahamsen, Håkon Bjorheim Abrahamsen	**Lorenzo Comberti,** Gabriele Baldissone, Micaela Demichela	**Olga Burianová,** Jiří Urbánek
	On some applications of the fleet assignment models for measurement of schedule reliability performance in unstable environment	A Graphical Method for Diagnosing the Effectiveness of a Maintenance Plan	A systems approach to identify hidden assumptions in the background knowledge	Risk Awareness Versus Risk Assessment in Manufacturing: a Field Study.	Dynamic Model of the Finance Flows Secure Continuity Into European Value Added Tax Environments
14:40-15:00	**Axel Berres,** Tim Bittner, Marc Zeller	**Adriaen Verheyleweghen,** Himanshu Srivastav, Anne Barros, Johannes Jäschke	**Vladik Kreinovich,** Aaron Velasco, Solymar Ayala, Olga Kosheleva	**Emil Augustyn,** Adam Kadziński, Piotr Smoczyński	**Olga Burianová,** Jiří Urbánek
	Automated Generation of Component Fault Trees	Combined Maintenance Scheduling and Production Optimization	How Earthquake Risk Depends on the Closeness to a Fault: Symmetry-based Geometric Analysis	Hazards Generated in Air Task Domain of Tactical Aircraft Operating System	Alliance Importance and Security Continuity of Funding European Budget
15:00-15:20	**Aesha M. Najem,** Frank P.A. Coolen	**Frits van Rooij,** Philip Scarf	**Dejan Škanata**	**Marco Pestana,** Carlos Morais, Alvaro Maia, Camila Brandão, Marcelo Martins, Andre Mendes	
	A Renewal Theory Approach to Cost Effective Component Swapping to Increase System Reliability	Towards a maintenance requirements analysis for maximizing production	Worst Case Risk	Alternatives of Carbon Dioxide Disposal in Pre-salt Offshore Exploration	

SESSION	M04 - SESSION 11	T09 - SESSION 11	T17 - SESSION 11	M06 - SESSION 11	T11 - SESSION 11
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Rossella Bisio	Marvin Hinz	Günter Becker	Massimiliano Giorgio	Zdenko Šimić
TOPIC	Human Factors and Human Reliability	Maritime and Offshore Technology	Autonomous Transportation	Mathematical Methods in Reliability and Safety	Nuclear Industry
15:40-16:00	Surbhi Bansal, Jon Tømmerås Selvik, Eirik Bjorheim Abrahamsen	A. P. Teixeira, H. Rong, C. Guedes Soares	Antoine Tordeux, Basma Khelfa	Carsten Proppe	Nadine Berner, Matthias Utschick
	Alignment of the Petro-HRA method with risk perspectives in the Norwegian oil and gas industry	Risk of Ship Near Collision Scenarios Off the Coast of Portugal	Dynamic Safety Analysis of Longitudinal Motion Planning for Autonomous Vehicles	Reliability Estimation With Multi-fidelity Simulation Methods	Network-based analysis of hazard dependency patterns prior to the automated integration into PSA models
16:00-16:20	Saikrishna Govindarajan, Jan Erik Vinnem	Jann-Eike Saathoff, Kirill Schmoor, Martin Achmus, Mauricio Terceros	S.O. Johnsen, T.E. Evjemo	Asamh Al Luhayb, Frank Coolen, Tahani Coolen	Jan-Erik Holmberg
	Influence of Human-Organizational factors in major Hydrocarbon leaks in the Norwegian continental shelf	Investigation on the Reliability of Lateral Loaded Monopile Foundations	State of the art of unmanned aircraft transport systems in industry related to risks, vulnerabilities and improvement of safety	Generalizing Banks´ Smoothed Bootstrap Method for Right-Censored Data	Experience from Level 2 Site Risk Analysis for Nordic Power Plants
16:20-16:40	Ilona Suojanen, P. Saskia Bayerl, Gabriele Jacobs	Meriam Chaal, Miguel Calle, Pentti Kujala, Mika Salmi, et al.	Günter Becker	Gerhard Neubauer	Pavlin Groudev, Emil Kichev
	Citizens' Positive Safety Perceptions in Public Spaces in Rotterdam	Miniature Marine Structures to Reproduce Structural Damage in Ship Collision Scenarios: from Similarity Laws to Additive Manufactured Models	Systematic in-Depth Structural Considerations for Safety / Security Issues of Autonomous Vehicles	Estimation from small sample staircase experiments	Reassessment the Importance of the Safety Systems Availability in the NPP Accident Progression
16:40-17:00	**M17 - SESSION 11** Organizational Factors and Safety Culture Asbjørn Lein Aalberg, Rolf Johan Bye, et al.	Krirkkajon Tanadrob, Chakrit Suvanjumrat, Wonsiri Punurai	Thomas Porathe	Mahmood Shafiee, Esmat Baghdadi	Subong Lee, Jonghyun Kim
	Beyond the numbers: A qualitative field study exploring negative trends in safety climate in the Norwegian oil and gas industry	The Surrounding Water Effect in the Speedboat Collision Modeling	Safety of autonomous shipping: COLREGs and interaction between manned and unmanned ships	A Stackelberg game theory approach to optimize warranty length, upgrade level and sale price for risk-averse buyers of second-hand products	A Computerized Operator Support System to Monitor the Technical Specifications
17:00-17:20	Asbjørn Lein Aalberg, Rolf Bye, Leif Inge Sørskår	Yang Wang, Xudong Ouyang, Bing Wu, Tengfei Wang	Hyungju Kim, Odd Ivar Haugen, Børge Rokseth, Mary Ann Lundteigen	Lijie Cui, Cong Jiping, Zhang Jiakui, et al.	Zdenko Šimić, Miguel Peinador Veira, Giustino Manna
	Perceptions of ferry crew members´ emergency preparedness capacities	An Extensive Form Game Based Multi-ship Collision Avoidance Scheme	Comparison of Hazardous Scenarios for Different Ship Autonomy Types using Systems-Theoretic Process Analysis	Analysis and verification methods of the UAS braking system based on STAMP/STAP	Insights from Meta Study of Nuclear Power Plants Operational Experience Topical Studies

SESSION	T01 - SESSION 11	M05 - SESSION 11	M18 - SESSION 11	M10 - SESSION 11	T04 - SESSION 11
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Yongtao Bai	Silvia Tolo	Luca Landi	Francisco Brocal	Yiping Fang
TOPIC	Aeronautics and Aerospace	Maintenance Modeling and Applications	Risk Analysis and Safety in Standardization	Risk Management	Critical Infrastructures
15:40-16:00	Zheng Wang, Yi Yhang, Xingxing Li, Bin Li, Lin Gao	María Berrade, Francisco Badía, Esteban Calvo	Huixing Meng, Kanittha Setthapitayakul, Yan-Fu Li	Mohammad Rajabalinejad	Vendula Onderková, David Rehak, Veronika Brabcova
	Analysis of influencing factors of fluoride precipitation in cable for hermetic cabin in space	A Delay Time Model for Stochastic Dependence	Similarity analysis of terminologies in standards: Case study on international RAMS standards	Towards Full Systems Integration Readiness Assessment	Determinants of Dynamic Modelling of the Critical Infrastructure Elements Resilience
16:00-16:20	Marta Woch, Damian Mazurek, Justyna Tomaszewska, Norbert Grzesik, Mariusz Zieja	Radim Bris, Nuong Thi Thuy Tran	Insaf Sassi, El-Miloudi El-Koursi	Christine Große, Pär M. Olausson, Susanne Wallman-Lundåsen	Jørn Vatn
	Hazards and Risk Minimization of Manned Interplanetary Missions	Comparison of Two Maintenance Models to Quantify Unavailability of Systems With Components With Dormant Failures	On-board train integrity: safety requirements analysis	Blackout Ahead: Methodological Concerns in Studies of Critial Infrastructure Protection	Cyber-physical threats and real time monitoring of critical infrastructure
16:20-16:40	Tor Erik Evjemo, Stig Johnsen	Benoîte de Saporta, François Dufour, Huilong Zhang	Tonja Knapstad, Morten Sommer, Ove Njå	Dana Prochazkova, Jan Prochazka	Daogui Tang, Yi-Ping Fang, Enrico Zio
	Lessons learned from increased automation in aviation: the paradox related to the high degree of safety and implications for future research	Dynamic optimization of maintenance policies for multistate system	The communication of Vision Zero values in tunnel safety management	Complex Technical Facilities Risk Management Responsibilities	A zero-sum Markov defender-attacker game for modeling false pricing in smart grids and its solution by multi-agent reinforcement learning
16:40-17:00	Muhammad Zakir Sheikh	Qiannan Liu, Lin Ma	Alessandro Stecconi, Luca Landi, Enrico Annacondia, Mirco Vertelli	Yujia Wang, Ying Chen, Rui Kang	Federico Antonello, Piero Baraldi, Ahmed Shokry, Enrico Zio, Ugo Gentile, Luigi Serio
	Effect of Temperature and Strain-rate on Mechanical Properties of Thermoplastic Polyurethane Interlayer	Condition-based Maintenance model considering positive and negative maintenance effects for dependent competing failure processes	Utilization rates of NC lathe machine for evaluation of safety requirements	An intelligent inference method on electronic products' failure mechanism considering uncertain mission profiles	Data-Driven Extraction of Association Rules of Dependent Abnormal Behaviour Groups
17:00-17:20	Tianyang Pang, Tianxiang Yu, Xinchen Zhuang, Bifeng Song	Xingheng Liu, Yann Dijoux, Jørn Vatn		Aud Nilsen, Andrè Karlsen	Jarosław Łukasiak, Adam Rosiński, Jacek Paś, Marek Szulim
	Wear Prediction of the Hinge in An Aircraft Lock Mechanism	On Approximation of Superpositoin of Renewal Process		Combining Risk Management and Foresight Management to foresee challenges in future migration	Exploitation of Electronic Systems in Building Objects Exposed to Impact of Strong Electromagnetic Pulses

26.09. THURSDAY, 9:00-10:20,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M17 - SESSION 12	M12 SESSION 12	T13 - SESSION 12	T08 - SESSION 12	T11 - SESSION 12
ROOM	A320	E415	F342	B305	F142
CHAIR(S)	Brett Molesworth	Patrick Weber, Shan Jiang	Lillian K. Stene	Marcin Hinz	Paulo Frutuoso e Melo
TOPIC	Organizational Factors and Safety Culture	Structural Reliability	Security & Cyber Security	Manufacturing	Nuclear Industry
9:00-9:20	Grete Rindahl, Ann Britt Skjerve	Patrick Weber, Marc Fina, Werner Wagner	Kine Reegård, Claire Taylor, Vikash Katta	Ahmad Kamal Ariffin, Fauziana Lamin, Intan Mohamed	Paulo Frutuoso e Melo, Maria Oliveira, Danielle Teixeira, Thiago Roberto, Edson Junior
	Trust me, you will benefit from tearing down your workplace!	Time domain simulation of earthquake excited buildings using a fuzzy stochastic approach	The concept of Cybersecurity Culture	Hardness Prediction Model of Aluminium Alloy with Hardening Behaviour Induced by High Pressure Torsion	Sensitivity Analysis of the Reactivity of a Hollow Fuel Rod With Biconcave Cross Section for a PWR
9:20-9:40	Sarka Hoskova-Mayerova, Svajone Bekesiene, Vilmantas Bekesius	Ming Yuan, Yuan Luo, Lian Huang, Donghuang Yan	Jens Braband, Hendrik Schäbe	Jon Martin Fordal	Diana Moreno, Jean-François Vautier, Guillaume Hernandez, Franck Guarnieri
	Assessing Safety Culture in the Largest European Airlines	Fatigue Stress Spectra and Reliability Evaluation of Short- to Medium-span Bridges Under Stochastic and Dynamic Traffic Load	A Semi-formal Approach Towards Likelihood Evaluation in Cybersecurity Risk Assessment	Indicator for measuring performance of planned maintenance stops - an enabler for continuous improvement	Systems Thinking in Risk Management by Preventive & Detective Controls as an Ago-Antagonistic Systems Approach in the French Nuclear Sector
9:40-10:00	Trond Kongsvik	Katharina Kremer, Steffen Freitag, Philipp Edler, Michael Hofmann, Günther Meschke	Marek Pawlik	Lei Li, Xu Luo, Shi-Gang Zhang	Ander Gray, Andrew Davis, Edoardo Patelli
	Internationalization of the construction industry: a short review of the consequences for occupational safety	Structural Reliability and Durability Assessment of Reinforced Concrete Structures	Safety of the signaling data processing and transfer - railway cybercrime immunity challenge	On the relationship between machine reliability parameters and buffer capacities in unreliable production lines	Towards an Interval Particle Transport Monte Carlo Method
10:00-10:20	Brit-Eli Danielsen, Gunnar Lamvik	Shan Jiang, Yan-Fu Li	Sissel Jore		
	Making sense of bridge design: how seamanship may challenge technology-as-designed	A Novel Model to Investigate the Shock Effects on Fatigue Life	The Multifaceted Aspect of Uncertainty - the Significance of Addressing Uncertainty in the Management of the Transboundary Wicked Problem of Terrorism		

26.09. THURSDAY, 9:00-10:20, 10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M13 - SESSION 12	M05 - SESSION 12	M09 - SESSION 12	M03 - SESSION 12	T04 - SESSION 12
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Java Markova	Anne Barros		Terje Aven, Enrico Zio	Matteo Spada
TOPIC	System Reliability	Maintenance Modeling and Applications	Risk Assessment	Foundational Issues in Risk Assessment and Management	Critical Infrastructures
9:00-9:20	Xiang-Yu Li, Yang Feng Li, Hong Zhong Huang	Ahmed Shokry, Luca Pinciroli, Piero Baraldi, Enrico Zio	Åsa S. Hoem	Zhiguo Zeng, Enrico Zio	Tove Rydén Sonesson, Jonas Johansson
	Reliability Optimization Model of Phased-mission System with Mixed Stand-by Redundancy Strategy	An Unsupervised Method for the Reconstruction of Maintenance Intervention Times	Risk analysis in the design phase of Maritime Autonomous Surface Ships	Assessing reliability reputation of products based on online customer reviews	Modeling National Interdependent Critical Infrastructures: Application and Discussion for the Swedish Power and Internet Backbone
9:20-9:40	Yifan Li, Hong-Zhong Huang, Xiang Li	Tiffany Cherchi, Camille Baysse, Benoîte de Saporta, François Dufour	André Alexandersen Hauge, Terje Sivertsen, Bjørn Axel gran	Lisbet Fjæran, Terje Aven	Krzysztof Boryczko
	Reliability Modeling and Evaluation for Command and Control Network Based on FTA Method	Optimal predictive maintenance policy for multi-component systems	Evaluating Approaches Supporting Safety Argumentation for Inclusion in a Safety Assessment Framework for Efficient Transport	Successful Stakeholder Involvement Requires a Common Understanding of the Risk Concept	Failure forecast of the water supply network
9:40-10:00	Xiaojun Zhang, Jin-E Huang, Tian Jun, Dongyi Wang	Céline Vinuesa, Florent Brissaud, Cyrille Folleau		Lech Bukowski	Jan Prochazka, Dana Prochazová, Zdenko Prochazka
	Reliability Evaluation of Radar Servo Control System Based on Enhanced Go Methodology	Optimizing proof test policy for redundant safety-related systems		Assessment of Disruption Risk Based on the Knowledge Maturity Concept	Measures for Bridges Safety Management Improvement
10:00-10:20	Milan Holicky	Francesca Marsili, Jörg Bödefeld, Hans Daduna, Pietro Croce			
	Reliability Approach to Assessment of Existing Structures	Availability and performance measures for planning maintenance actions on waterways networks			

**THURSDAY, 10:50-12:10,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION**

SESSION	M17 - SESSION 13	M12 - SESSION 13	T13 - SESSION 13	T05 - SESSION 13	T11 - SESSION 13
ROOM	**A320**	**E415**	**F342**	**B305**	**F142**
CHAIR(S)	Mark Sujan	Zhonglai Wang, Marcos Valdebenito	Pieter Van Gelder	Gilberto Martha de Souza	Moosung Jae
TOPIC	Organizational Factors and Safety Culture	Structural Reliability	Security & Cyber Security	Energy	Nuclear Industry
10:50-11:10	Christian Foussard, Wim Van Wassenhove	Zhonglai Wang, Zhihua Wang	Mohamad Houssein Monzer, Kamal Beydoun, Jean-Marie Flaus	Daniel Jung, Michel Vandenbergh, Ana Tibúrcio, Hugo Calisto, Ricardo Bolado	Pavlin Groudev, Antoaneta Stefanova, Rositsa Gencheva
	Professionalization in safety : Creating effective learning environments	Time-dependent Mechanism Reliability Analysis for Planer Linkage with Random Joint Clearance	Model based Design of Intrusion Detection Systems for ICS	All-contingency Approach to Risk Assessment of Multi-Area Power Grids	Assessment of VVER 1000 Core Degradation for Spectrum of Large Break Sizes Along With SBO
11:10-11:30	Svajone Bekesiene, Audrone Petrauskaite, Rolanda Markeliene, Rasa Gedminiene	Li-Xiang Cheng, Yan-Gang Zhao	Stig Ole Johnsen, Erik Nilsen Torkildson, Jingyue Li	Lars Hurlen, Kine Reegard, Asgeir Drøivoldsmo, Jan Erik Farbrot	Sunghyun Park, Seokwoo Sohn, Moosung Jae
	Human and Organizational Factors for Resilience of High-risk Military Operations: an Exploratory Study	A Structural Reliability Analysis Method Based on Information Exchange Krill herd Algorithm	Improving Security and Safety Co-analysis of STPA	The Power Grid Operator of the Future: New Capabilities Required to Successfully Adapt in a Fast-changing Market	Preliminary Evacuation Time Estimate in Korea and Its Application into Level 3 PSA
11:30-11:50	Natalia Jubault Krasnopevtseva	Marcos Valdebenito, Mauricio Misraji, Franco Mayorga, Héctor Jensen	Thor Myklebust, Per Håkon, Meland Tor, Stålhane Geir, K. Hanssen	Sander Willems, Pierre-Etienne Labeau, Jean-Claude Maun, Arnaud Vergnol, Jonathan Sprooten	Ikuo Kinoshita
	How to Design Rules for Managed Safety to Cope rather than Diminish Uncertainty?	Reliability Estimation in Stochastic Linear Dynamics Applying Directional Importance Sampling	The Agile RAMSS lifecycle for the future	Probabilistic Transmission Expansion Planning: On the effects of outcome variability on decision-making	A Limit Surface Prediction for PWR LOCA Transients Using Adaptive Machine Learning Techniques
11:50-12:10	Stefan Bracke, Monika Piskala	Cristóbal Acevedo, Iván González, Marcos Valdebenito, Héctor Jensen	Martin M. Sjøen, Sissel H. Jore	Sunday Ochella, Mahmood Shafiee	Shahen Poghosyan, Anders Gilbertson, Fernando Ferrante, Nathan Siu, Robertas Alzbutas, Tamas Siklossy
	Development of Innovative Products Versus Safety Engineering: Avoiding Goal Conflicts	Estimation of Second Order Statistics of Uncertain Linear Systems Applying Linear Expansion and Monte Carlo Simulation	How the counter-radicalization discourse securitizes education and why this might not be an effective approach to preventing terrorism	Artificial Intelligence in Prognostic Maintenance	IAEA Project on Aggregation of Various Risk Contributors for Nuclear Facilities

SESSION	M13 - SESSION 13	M05 - SESSION 13	M09 - SESSION 13	M02 - SESSION 13	T04 - SESSION 13
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Matthias Faes	Phuc Do	Marina Roewekamp	Eirik Bjorheim Abrahamsen	Zoe Nivolianitou
TOPIC	System Reliability	Maintenance Modeling and Applications	Risk Assessment	Economic Analysis in Risk Management	Critical Infrastructures
10:50-11:10	Lin Xie, Mary Ann Lundteigen, Yiliu Liu, Elias Kassa, Shengyang Zhu	Robert Hartung, Lennart Senger, Katharina Klemt-Albert	Loren Stewart	Dana Prochazkova, Jan Prochazka, Josef Riha, Vaclav Beran, Zdenko Prochazka	Inbar Shapira, Udi Barzelay, Knut Oien, Aleksandar Jovanovic
	Performance Assessment of Safety-instrumented Systems Subject to Cascading Failures in High-demand Mode	Linking Building Information Modeling and Structural Health Monitoring for reliable railway infrastructure	Using IEC 61511:2016 to Predict Realistic Data for Safety Instrumented Function Design	DSS for Ensuring the Coexistence of Technical Facility With Its Vicinity	Visualization of Critical Infrastructure Resilience Using Treemap
11:10-11:30	Joanna Akrouche, Mohamed Sallak, Eric Châtelet, Fahed Abdallah, Hiba Haj Chhade	Maxime Redondin, Laurent Bouillaut, Dimitri Daucher, Nadège Faul	Lisa Jackson, Melanie-Jane Stoneman, Sarah Dunnett, Louise Cooke	Ian Oliver, Sakshyam Panda, Sotiris Moschoyiannis	Elisa Ferrario, Alan Poulos, Juan Carlos de la Llera, Álvaro Lorca, Alfredo Oneto, Camilo Magnere
	Methodology for imprecise availability computing and optimization	A systematic replacement strategy in the context of a strongly censored life time. Application to road markings.	Investigating the decision-making approach to risk assessment in police custody	A Game Theoretic Model for Understanding and Modelling Cybersecurity for Telecommunications Operators	Representation and modeling of the Chilean electric power network for seismic resilience analysis
11:30-11:50	**Abderrahim Krini, Josef Börcsök**	Maxime Redondin, Ali Tidjani, Laurent Bouillaut, Dimitri Daucher	Luke Power, Sarah Dunnett, Lisa Jackson	**T21 - SESSION 13** Socio-Technical-Economic Systems **Danilo Taverna Martins Pereira de Abreu,** Maria Valentina Clavijo Mesa, Joaquim Rocha dos Santos, et al.	Yi-Ping Fang, Enrico Zio
	Forecasting Reliability of Components/Systems in Automobile Applications with Respect to three Variables of Stress in Field based on Neural Network	Impact of road infrastructure characteristics on road markings	Risk Assessment in Home Healthcare	Accidents in Seaports: an Analysis from the Perspective of System Dynamics	Resilience Management of Infrastructure Systems from a Multistage Decision Making Perspective
11:50-12:10		Ziyue Guo, Dong Zhou, Aimin Hao	Eric Ford, Hans Lohne, Jon Selvik		Zhaoyang Song, Wei Liu
		Virtual reality application for maintainability design: A case study of the practical project	Environmental Risk Assessments as Input to a Decision-Making Process: Examples From a Barents Sea Project		Operational Resilience of Urban Water Distribution Networks

26.09. THURSDAY, 13:00-14:20,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M17 - SESSION 14	T13 - SESSION 14	T05 - SESSION 14	T11 - SESSION 14
ROOM	A320	F342	B305	F142
CHAIR(S)	Trond Kongsvik	Sissel H. Jore	Piero Baraldi	Francesco Di Maio
TOPIC	Organizational Factors and Safety Culture	Security & Cyber Security	Energy	Nuclear Industry
13:00-13:20	Espen Nystad, Ann Skjerve, Magnhild Kaarstad, Lars Holmgren	Silvia Tolo, John Andrews	Gilberto Martha de Souza, Renan da Silva, Arthur Melani, Miguel Michalski, Silvio Nabeta	Frédérick Lamare, Aurélien Portelli
	Transfer of training addressing unforeseen safety-critical events in nuclear power plant operations	Nuclear Facilities and Cyber Threats	Defining Maintenance Significant Items Based on ISO55000 and AHP: a Hydropower Plant Case Study	The use of records to manage risks associated with the decommissioning of nuclear facilities
13:20-13:40	**T02 - SESSION 14** Chemical and Process Industry **Dominic Furniss,** Mark Sujan, Jamie Henderson, David Embrey	Dustin Witte, Daniel Lichte, Kai-Dietrich Wolf	Gilberto Martha de Souza, Arthur de Andrade Melani, Carlos Murad, Miguel Angelo de Carvalho Michalski, Adherbal Caminada Netto, Silvio Nabeta	Isabel Martón, Jose Villanueva, Ana Sánchez, Sebastián Martorell, Sofia Carlos, Francisco Sánchez-Sáez
	A Human Factors review of road tanker offloading across multiple organizations: Simple, complicated and complex problems	An Approach to Software Assisted Physical Security Risk Analysis and Optimization	Updating a Hydropower Plant Monitoring System Through Failure Modes and Symptoms Analysis	Parametric and No-parametric Methods for Estimating Multidimensional Tolerance Regions Associated to Safety Margins
13:40-14:00	Hamza Zerrouki, Hector Estrada-Lugo, Hacene Smadi, Edoardo Patelli	Richard Utne, Lillian Stene	Xuefei Lu, Federico Antonello, Piero Baraldi, Enrico Zio	Amaury Bazalgette, Jean-François Vautier, Guillaume Hernandez, Franck Guarnieri
	Applications of Bayesian networks in Chemical and Process Industries: A review	How is societal resilience in Norway influenced by different risk perspectives among representatives of naval organizations operating in the High North?	Data-Driven Identification of Critical Components in Complex Technical Infrastructures Using Bayesian Additive Regression Trees	Application and Evaluation of the Kirkpatrick Model (KPM) While Transferring Knowledge During the Renewal of Subcontractors at the French Alternative Energies and Atomic Energy Commission (CEA)
14:00-14:20	Nathaniel John Edwin, Jeevith Hegde, Ashutosh Kumar	Wendi Zhang, Tian Bai, Fuqiang Sun, Jiang Tongmin	Patrick Gasser, Marco Cinelli, Matteo Spada, Peter Burgherr, Božidar Stojadinovi	
	Development of a Blockchain for Operational Follow-up of Safety Instrumented Systems	A method for network security situation prediction based on LSTM	Indices under the spotlight: An approach to unveil and manage the implicit trade-offs between indicators	

26.09. THURSDAY, 13:00-14:20,
10 PARALLEL SESSIONS, 4 PAPERS PER SESSION

SESSION	M13 - SESSION 14	M05 - SESSION 14	T18 - SESSION 14	T21 - SESSION 14	T04 - SESSION 14
ROOM	A310	F128	F442	F428	B302
CHAIR(S)	Matteo Broggi		Enrico Zio	Marcelo Ramos Martins	Elisa Ferrario
TOPIC	System Reliability	Maintenance Modeling and Applications	Supply Chains	Socio-Technical-Economic Systems	Critical Infrastructures
13:00-13:20	Abderrahim Krini, Josef Börcsök	Yang Yunbin, Chen Gang, Liao Hongqiang	Jacek Ryczyński	Joaquim Santos, Danilo Abreu, Carlos Morais, Danilo Colombo, Marcelo Martins	Marek Pawlik
	Improvement Approaches in the Field of Reliability Forecasting for Components/Systems in Automobile Applications with Respect of Multivariate Stress Factors	Research on Maintenance Assessment Method & System for Complex Product based Digital Mock-Up	Influence of selected factors on the correct functioning of the liquid fuels supply chain - case study	Oil Well Life Cycle: A Perspective from System Thinking	Utilizing analogue and digital emergency stop functionalities in global system for mobile communication for rail
13:20-13:40	Sha Qin, Liming Ren, Fengxi Chen, Wei Zhang, Xiaopeng Li, Libing Zhao, Ding Liu, Xiaodong Shi	Xu Luo, ShiGang Zhang, ZheXue Ge, Lei Li	Min Huang, Zhou Huang, Huosheng Li, Tielin Shi	Jens Petter Johansen, Torgeir Kolstø Haavik	Gabriela Bjørnsen, Ove Njå
	Research on Model Based Method of Reliability Analysis for Space System	A maintenance time estimation method based on maintainability design attributes	A Retailer Dominated Reverse Logistics Network Design for Products Remanufacturing with Dual Channel under Uncertainty	Variability and resilience in industrial symbiosis for energy exchange	Applying Systems Theory to Increase Competence in Tunnel Fire Safety - Focusing on Fire and Rescue Service
13:40-14:00	Leila Marle, Florent Brissaud, Denis Faure	Shunfeng Mei, Dong Zhou, QiDi Zhou, ZiYue Guo	Sylwia Werbińska-Wojciechowska, Maciej Chlebus	**T23 - SESSION 14** Health Service Industry Matthew Naybour, Rasa Remenyte-Prescott, Matthew Boyd	Tomas Kertis, Dana Prochazkova
	Reliability factors analyses for gas transportation items	A Method for Quantitative Analysis of Accessibility Based on Path Planning	Issues on Supply Chain Reliability Measurement - Review and a Case Study	Ant Colony Optimization for Community Pharmacy Dispensing Process Based on In-field Observations	Identification of Assets of Metro Operation in Prague and Determination of Their Criticality
14:00-14:20	Cristian Maiorano, Emanuele Pascale, Fred Shenkelberg, Laurent Bouillaut, Paolo Sannino, et al.	Qidi Zhou, Dong Zhou, Shunfeng Mei, Aimin Hao	Shiyu Chen, Michele Compare, Enrico Zio	Mark Sujan, Dominic Furniss, David Embrey, Matthew Elliott, et al.	Olga Aneziris, Ioanna Koromila, Ernesto Salzano, Zoe Nivolianitou, Marko Gerbec
	MTBF (Metric That Betrays Folks)	Visual occlusion obstacle detection model based on finite element analysis in virtual environment	Agent-based modeling for energy supply chain resilience analysis	Critical Barriers to Safety Assurance and Regulation of Automated and Autonomous Infusion Devices	Safety and Security of ports with LNG bunkering systems

ESREL 2020 - CALL FOR PAPERS

**CALL TO ACTION
CALL TO PARTICIPATION
CALL FOR PAPERS**

ESREL 2020 PSAM 15
VENICE - ITALY

ESREL 2020 PSAM 15

June 21-26, 2020 Venice - Italy
www.esrel2020-psam15.org

Expo Tech: the World exposition of technical and scientific methods and solutions for the prevention and management of risk in complex systems and critical infrastructures

Don't miss the opportunity to contribute and participate to ESREL 2020 PSAM 15, the TOP Conference in 2020!
Join the 30th European Safety and Reliability Conference and the 15th Probabilistic Safety Assessment and Management Conference in Venice, Italy, on June 21-26, 2020. It will be a unique World Exposition (a real "Expo Tech") of scientific methodologies and technical solutions 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 the 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 to make it safer.

Each abstract and paper will be evaluated by peer reviewers. Abstract-only presentations (no paper needed) are also accepted. As customary, paid registration to the Conference is mandatory for abstract/paper acceptance (one registration per abstract/paper).

The publication of the full set of accepted papers will be referenced by SCOPUS, EI COMPENDEX and THOMSON REUTERS (ISI Web of Knowledge, Conference proceedings) citation indexes. Publication of selected works in special issues of indexed scientific journals will be pursued.

"We live in a World 4.0 made of complex systems and infrastructures that are becoming more and more interdependent systems of systems. Industry 4.0, robotics, drones, driverless cars, augmented and virtual reality, data and artificial intelligence, connectivity and 5G, intelligent systems and smart cities...the healthy living of this World of the future, which we are building and which we will leave to those who follow, depends on the reliability and safety of the complex systems and infrastructures which it will stand upon: if we design and operate them in a way that they are reliable and safe, then it will, indeed, be a smart and sustainable World."
Enrico Zio, 2019

It is for contributing to the developments in the direction of a smart and sustainable World that you are invited to participate as main actors to the ESREL 2020 PSAM 15 ExpoTech Conference, the World event on the prevention and management of risk in complex systems and critical infrastructures.

General Chair:
Enrico Zio
CRC - Centre de recherche sur les Risques et les Crises, Mines ParisTech, Sophia Antipolis, France and Energy Department, Politecnico di Milano, Italy
Eminent scholar at Kyung Hee University, Republic of Korea
Distinguished guest professor at Tsinghua University, China
Adjoint Professor at Beihang University, City University of Hong Kong and Wuhan University, China
Co-Director of the Center for REliability and Safety of Critical Infrastructures (CRESCI) and the Risk Science and Engineering (RISE) laboratory at Beihang University, China

General co-Chair:
Terje Aven
SEROS - Centre for Risk Management and Societal Safety, Faculty of Science and Technology, University of Stavanger, Norway

Technical Program Chairs:
Piero Baraldi
Energy Department, Politecnico di Milano, Italy
Francesco Di Maio
Energy Department, Politecnico di Milano, Italy

Technical Program co-Chair:
Johan Sörman
Lloyd's Register, Stockholm, Sweden

Organizers & Conference Secretariat:
ARAMIS TechExpo s.r.l., Italy
phone: (+39)02-89041311;
email: ESREL2020PSAM15@aramis3d.com

Main Conference Topics

- Accelerated Degradation and Life Tests
- Accident and Incident Modeling
- Artificial Intelligence for Reliability, Maintenance and Safety
- Augmented Reality for Safety
- Big Data and IoT Applications in Reliability and Maintenance
- Computational Reliability/Risk Assessment
- Consequence Modeling and Management
- Crisis Management
- Cyber Security
- Dependability
- Dependence and Common Cause Failures Modeling and Analysis
- Disaster Management
- Dynamic Reliability/Risk Assessment
- Economic Analysis in Risk Management
- Environmental Risk Analysis
- External Hazards Risk Assessment
- Foundational Issues in Risk Assessment and Management
- Geologic Risk Assessment
- Human Factors and Human Reliability
- Industrial Safety
- Industry 4.0 Reliability and Safety
- Insurance Risk
- Internal Hazards Risk Assessment
- Machine Learning for Reliability, Maintenance and Safety
- Maintenance Modeling and Applications
- Mathematical Models and Methods for Reliability and Safety
- Medical Risk
- Natural Hazards Risk Assessment
- Occupational Safety
- Optimization of Reliability, Maintenance and Safety
- Organizational Factors
- Policy Making and Legislative Issues
- Predictive Maintenance
- Prognostics and System Health Management
- Quality
- Resilience Analysis, Assessment and Management
- Risk Acceptance Criteria
- Risk Analysis and Safety in Standardization
- Risk Assessment
- Risk Governance and Societal Safety
- Risk Informed Applications
- Risk Management
- Risk Perception and Communication
- Risk Prevention
- Risk-based Decision Making
- Safety Culture
- Security
- Site Level Multi-Unit Multi-Source Risk Assessment

Smart Devices and Systems Reliability
- Software Reliability and Safety
- Structural Health Management
- Structural Reliability
- System Reliability
- Uncertainty and Sensitivity Analysis
- Virtual Reality for Safety
- Web Security

Main Industrial Areas

- Aeronautics and Aerospace Industry
- Agriculture and Aquaculture Systems
- Automotive Industry
- Autonomous Transportation
- Banking and Finance
- Chemical and Process Industry
- Civil Engineering
- Critical Infrastructures
- Cyber-Physical Systems
- Data Centers
- Electric Power Industry
- Electronics
- Energy Industry
- Food Industry
- Health and Medicine
- Health Service Industry
- Information Technology and Telecommunications
- Insurance
- Land Transportation
- Land Use Planning
- Manufacturing
- Maritime and Offshore Technology
- Materials
- Nuclear Industry
- Oil and Gas Industry
- Railways Industry
- Renewable Energy Industry
- Smart Cities and Systems
- Socio-Technical-Economic Systems
- Supply Chains
- Water Transportation Systems
- Web Systems

Important Dates

2019

November 10:
Abstract Submission

December 5:
Abstract Acceptance

2020

January 15:
Full Paper Submission

March 1:
Notification of Acceptance

March 15:
Final revised full paper submission and early-bird registration deadline

ISRERM 2020 - CALL FOR PAPERS

ISRERM
A SAFER FUTURE

Call for Papers

ISRERM2020

7th International Symposium on Reliability Engineering and Risk Management

June 5 - 8, 2020

Beijing University of Technology Beijing, China.

Organized By
- Beijing University of Technology
- Tongji University
- International Association for Structural Safety and Reliability (IASSAR)

About ISRERM

Reliability engineering and risk management have been attracting increasing attention and are of growing importance in civil, mechanical, aerospace and aeronautics, offshore and marine engineering, as well as in many other disciplines of engineering. With this background, the aim of the International Symposium on Reliability Engineering and Risk Management (ISRERM2020) is to bring engineers & scientists all over the world together to present and discuss innovative methodologies and the practical applications of these technologies in the field of reliability engineering and risk management. Emerging concepts as well as state of the art and novel applications of reliability principles and risk based decision making in all types of structures, infrastructures and mechanical systems will be emphasized within the scope of the symposium. In this context, papers on theories, methods, algorithms and applications are all welcome.

Submission and Publication

Abstracts of about 200 words on any of the topics are invited due to **Oct. 20, 2019**. All abstracts and full papers must be submitted electronically in MS-WORD format. Each presenting participant can submit only one manuscript. Detailed instructions will be available at the official website: http://www.isrerm2020.com/. Each paper will be reviewed by at least two reviewers. The paper must be well written in acceptable English language, containing an informative introduction and major findings and/or conclusions. Accepted papers will be published in a special volume of the conference proceedings with international standard book number (ISBN). The Scientific Committee of ISRERM2020 will select and recommend some of the conference papers (based on the quality) for submission in *ASCE-ASME Journal of Risk and Uncertainty in Engineering*, *Part A: Civil Engineering* and *Part B: Mechanical Engineering*.

Topics

- Bayesian methods
- Big data & AI
- Climate change related impacts
- Climate resilience of infrastructure
- Coastal management system
- Damage analysis and assessment
- Decision analysis
- Durability & life-cycle analysis
- Economics of resilience
- Environment management system
- Extreme value analysis for hazards affected by climate change
- Geotechnical reliability
- Infrastructure adaptation to a changing climate
- Imprecise probabilities
- Lifeline engineering systems
- Measurement science and metrics for sustainability & resilience
- Maintenance strategy based on risk cost optimization
- Natural and man-made hazards
- Performance-based design methods
- Random vibrations
- Reliability-based optimization and control
- Reliability theory
- Risk assessment models
- Risk communication
- Socioeconomic aspects of resilience and sustainability
- Stochastic finite element analysis
- Stochastic mechanics
- Stochastic dynamics and controls of engineering system
- Structural health monitoring
- Superstructure management system
- Sustainable construction technologies
- System reliability
- Time-dependent reliability
- Uncertainty quantification
- Underground space

Venue

Beijing University of Technology
http://english.bjut.edu.cn/

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Symposium Chair

Zhao-Hui Lu, Prof., Beijing University of Technology

Important Dates

Deadline for abstract submission	Oct. 20, 2019
Notification of abstract acceptance	Oct. 31, 2019
Deadline for full paper submission	Dec. 31, 2019
Notification of full paper acceptance	Jan. 20, 2020
Deadline for registration	May 25, 2020
Symposium	Jun. 5-8, 2020

Fees

The early and ordinary registration fee for participants (students) are 500$ (200$) and 550$ (250$). The registration fee will cover attendance at all sessions of the symposium, symposium teas and lunches, final program book and Abstract booklet, the welcome reception and the symposium dinner.

Post-Symposium Tour

Badaling Great Wall is located to the northwest of downtown Beijing. Badaling Great Wall was built along the ridges of mountains, looking precipitous from the external wall but gently sloped from the internal wall. It was listed among the first batch of important cultural relic sites under state-level protection by the Central Government, the best of the top 10 scenic spots in the country. In the appraisal of the world's new seven wonders, Great Wall maintained its top position because of its extensive and profound history and culture, and unprecedented prestige in the world.
http://www.badaling.cn/language/en.asp

Sponsorship

The Symposium is sponsored jointly by Beijing University of Technology, Tongji University and the International Association for Structural Safety and Reliability (IASSAR).

Secretariat & Contact Us

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7th Asian-Pacific Symposium on Structural Reliability and its Applications (APSSRA2020)

October 4-7, 2020
The University of Tokyo, Tokyo, Japan

http://risk.arch.t.u-tokyo.ac.jp/APSSRA2020/

Objective

The first Asian-Pacific Symposium on Structural Reliability and its Applications (APSSRA) was held in Tokyo, Japan in November 1995. Since then, APSSRA is held every four years between ICASP and ICOSSAR in various Asian cities including Taipei, Seoul, Hong Kong, Singapore and Shanghai. The seventh APSSRA will be held in October 2020 in Tokyo Japan again with the theme:

Risk Management for Sustainable Development
– From Reliability to Risk, from Academia to Society

Risk management is a framework that integrates structural reliability concepts or other related concepts useful to developing solutions to issues related to resilience, sustainable development, and disaster risk reduction in the Asian-Pacific region. APSSRA 2020 will highlight new challenges of techniques and methodologies in civil engineering related to this field.
We look forward to seeing you in Tokyo in 2020.

Important Dates

Aug 2019 OS proposal due
Nov 2019 Abstract submission due
Apr 2020 Full paper submission due
Jun 2020 Notification of acceptance

Correspondence

Symposium Chair: Tsuyoshi Takada – Professor, The University of Tokyo, Japan
Secretariat: Tatsuya Itoi – Associate Professor, The University of Tokyo, Japan
(email: apssra2020@load.arch.t.u-tokyo.ac.jp)

PROGRAM SUMMARY

TOPICS

Methodologies

M01	Accident and Incident Modeling
M02	Economic Analysis in Risk Management
M03	Foundational Issues in Risk Assessment and Management
M04	Human Factors and Human Reliability
M05	Maintenance Modeling and Applications
M06	Mathematical Methods in Reliability and Safety
M07	Prognostics and System Health Management
M08	Resilience Engineering
M09	Risk Assessment
M10	Risk Management
M11	Simulation for Safety and Reliability Analysis
M12	Structural Reliability
M13	System Reliability
M14	Uncertainty Analysis
M15	Software Reliability and Safety
M16	Environmental Risk Analysis
M17	Organizational Factors and Safety Culture
M18	Risk Analysis and Safety in Standardization
M19	Ecology and Epidemiology

Application Areas and Technological Sectors

T01	Aeronautics and Aerospace
T02	Chemical and Process Industry
T03	Civil Engineering
T04	Critical Infrastructures
T05	Energy
T06	Information Technology and Telecommunications
T07	Land Transportation
T08	Manufacturing
T09	Maritime and Offshore Technology
T10	Natural Hazards
T11	Nuclear Industry
T12	Occupational Safety
T13	Security & Cyber Security
T14	Oil and Gas Industry
T15	Cyber Physical Systems
T16	Smart Cities and Systems
T17	Autonomous Transportation
T18	Supply Chains
T19	Food Security
T20	Agriculture and Aquaculture Systems
T21	Socio-Technical-Economic Systems
T22	Insurance, Banking and Finance
T23	Health Service Industry
TC304	Geotechnical Risk, Reliability, and Data Analytics

MONDAY

TRACK:	1	2	3	4	5	6	7	8	9	10
11:30 **11:50** Session 1 **12:10** **12:30**	M01	M12	M11	M06	M07	M13	T12	M09	M14	T07
14:00 **14:20** Session 2 **14:40** **15:00**	M01	M12	M11	M06	M07	M13	T12 T20 T10	M09	M14	T07
15:40 **16:00** **16:20** Session 3 **16:40** **17:00**	M01 M09	T09	M11	M06	M07	M13	T10	M18	M14	T03

TUESDAY

TRACK:	1	2	3	4	5	6	7	8	9	10
9:40 **10:00** Session 4 **10:20** **10:40**	M04	M12	M08	M06	M07	M13	M15	M09	M10	T07
11:30 **11:50** Session 5 **12:10** **12:30**	M04	M12	M08	M06	M07	M13	M15	M09	M10	TC304
14:00 **14:20** Session 6 **14:40** **15:00**	M04	M12	M08	M06	M07	M13	M05	M09	M14	TC304
15:40 **16:00** **16:20** Session 7 **16:40** **17:00**	M04	T09	M11	M06	T11	T01	M05	M18	M14	T03

WEDNESDAY

	TRACK:	1	2	3	4	5	6	7	8	9	10
9:40 / 10:00 / 10:20 / 10:40	Session 8	M04	M12	M08	M06	M07	M13	M05	M09	M10	T03
11:30 / 11:50 / 12:10 / 12:30	Session 9	M04	M12	T15	M06	M07 / T14	M13	M05	M09	M10	T03
14:00 / 14:20 / 14:40 / 15:00	Session 10	M04	M12	T13	M06	T14	M13	M05	M09	M10	T22
15:40 / 16:00 / 16:20 / 16:40 / 17:00	Session 11	M04 / M17	T09	T17	M06	T11	T01	M05	M18	M10	T04

THURSDAY

	TRACK:	1	2	3	4	5	6	7	8	9	10
9:00 / 9:20 / 9:40 / 10:00	Session 12	M17	M12	T13	T08	T11	M13	M05	M09	M03	T04
10:50 / 11:10 / 11:30 / 11:50	Session 13	M17	M12	T13	T05	T11	M13	M05	M09	M02 / T21	T04
13:00 / 13:20 / 13:40 / 14:00	Session 14	M17 / T02		T13	T05	T11	M13	M05	T18	T21 / T23	T04