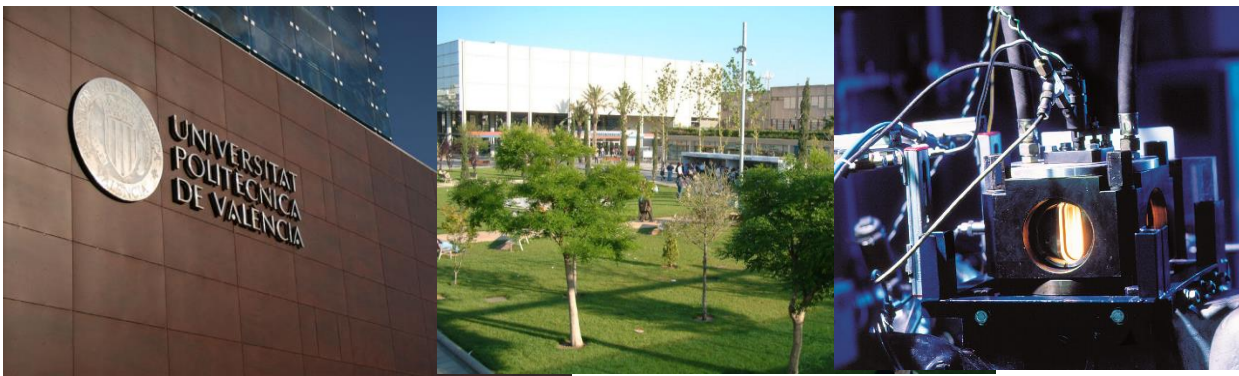# 57th ESReDA Seminar on

Advances in Reliability, Risk and Safety Analysis with Big Data

23rd and 24th October 2019

Universitat Politècnca de Valencia, Spain

Program and Venue

Scope of the Seminar

Industrie 4.0 is an industrial action that corresponds to the increasing integration of industrial production and information and communication technologies. It includes different aspects, among them cyber-physical systems, big data, internet of things, augmented reality, cloud computing and cognitive computing.

With recent improvements in sensor technologies, including miniaturization, performance, cost and energy consumption and in information systems resulting in increased functionality at lower costs, obtaining very important quantities of data from running industrial equipment in a cost-effective manner is now a standard practice.

To treat all the data gathered by the sensors and to transform it in useful information, industries seek to make a greater use of Artificial Intelligence (AI). There are several AI techniques, as are Machine Learning, Predictive Modelling and Deep Learning.

Among the most promising applications of these concepts can be found in Reliability, Risk and Safety Analysis. In seeking, opportunistically, the benefits from these new technological capabilities, it is important to remain critical and to address potential side or adverse effects as well especially for high-risk industries where errors can become dramatic. It is the role of the ESReDA association to organise an expert debate and further collaborative work on this topic.

For this 57th ESReDA Seminar we are concerned and invite to focus on Big Data challenges and applications. So the main topics will be the discussion of the following subjects:

- Retention and quality of data
- Data analytics
- Feature selection and extraction
- Identifying potential biases
- Data ownership and security
- Databases

The main point is: what can be done to improve the management of reliability, risk and safety making good use of these new capabilities?

This Seminar will be a forum to explore and discuss these topics. The Seminar is aimed at addressing issues met by different industries.

The programme proposes technical papers which cover different topics concerned with the application of Artificial Intelligence to Reliability, Risk and Safety Analysis. Besides, a specific round table discussing the different topics is organised. The technical programme includes plenary presentations by leading academics and scientists.

Seminar Organisation and Venue

Location

The School of Engineering Design, building 7B
http://www.upv.es/plano/plano-2d-en.html
Technical University of Valencia / Universitat Politècnica de València (UPV)
Camino de Vera, s/n
46022 Valencia
SPAIN

Organisation

The Seminar is jointly organised by ESReDA and CMT Motores Térmicos (UPV).

Chairman of the Seminar

L. Ferreira (ESReDA President, Prof. Universiy of Porto, Portugal)

B. Tormos (CMT senior researcher, Prof. Universitat Politècnica de València, Spain)

Technical Programme Committee

- Antonio Sola - Consultant, Spain
- André Lannoy - IMdR/ESReDA, France
- Bernardo Tormos - Universitat Politècnica de València, Spain
- Henk Wells – Consultant, The Netherlands
- Kaisa Simola - EC JRC Petten, The Netherlands
- Luís Ferreira – Universidade do Porto, Portugal
- Marco Riani – University of Parma, Italy
- Maria Grazia Gnoni – Università di Salento, Italy
- Micaela Demichela – Politecnico de Torino, Italy
- Mohamed Eid - CEA, France
- Mohammad Raza – GE Power, Switzerland
- Nicolas Dechy - Institut de radioprotection et de sûreté nucléaire, France
- Rasa Remenyte-Prescott - University of Nottingham, United Kingdom
- Siegfried Eisinger - DNV GL, Norway
- Tuuli Tulonen – Tukes, Finland,
- Vytis Kopustinskas - EC JRC Ispra, Italy
- Victor Borges - Thales, UK

Opening of the Seminar

To be announced

Closing of the Seminar

The President of the Board of Directors of ESReDA

Relevant dates:

- 22nd October 2019: Project Groups meetings, Board of Directors meeting.
- Seminar: 23rd and 24th October 2019
- ESReDA Gala Dinner: 23rd October 2019

Draft Program

Note: All the meetings and Seminar Sessions will take place at The School of Engineering Design, building 7B

Tuesday, October 22nd 2019

10:30   Project Group meetings

12:30   Lunch

14:30 – 17:30 Board of Directors meeting

Wednesday, October 23rd 2019

Seminar Day 1

09:00 - 09:10 Welcome address by President and Seminar chair, Luis Ferreira
09:10 - 09:30 Welcome address by Chair, University of Valencia.

09:30 - 10:30 Key Note speech 1:
Dr.Prof. Olga Fink – "System health monitoring with deep learning: Is big data all we need?"

10:30 - 11:00   Coffee Break

11:00- 12:30   Session I - Safety and big data

11:00 – 11:30	Siegfried Eisinger, Jon Arne Glomsrud, Justin Fackrell	Recommended Practice for Assurance of Data-driven Algorithms and Models
11:30 – 12:00	Mathias Verbeke, Alessandro Murgia, Tom Tourwé, Elena Tsiporkova	Fleet-based Remaining Useful Life Prediction of Safety-critical Electronic Devices
12:00 – 12:30	C. Harrison, X. Ge, J. Stow	Assessing GB Train Accident Risk Using Red Aspect Approaches to Signal Data

12:30 – 13:30   Lunch

13:30 – 15:00   Session II - Data and prediction

13:30 – 14:00	Henk Wels	Quality in data for unavailability of power plants
14:00 – 14:00	Luís Pereira, Luís Ferreira	Mechanical seal failure prediction in an oil refinery: a first attempt to solve the problem using a data-driven approach
14:30 – 15:00	Asun Lera St.Clair	Trust in AI

15:00- 15:30   Coffee Break

15:30- 17:00   Panel Discussion: Risk Based Inspections using big data analytics- do we have a clear path way?
             Panelists: Henk Wels, Mohammad Raza
             Moderator: Luís Ferreira

17:00- 17:15   Presentation of next Seminar and other ESReDA and ESRA activities

17:15 – 18:30 - Visit to the University of Valencia Research Centre: CMT-Motores Térmicos

19:30   Dinner at Restaurant (*Restaurant in downtown Valencia, to be announced*)

Thursday, October 24th 2019

         Seminar Day 2

09:00- 10:00   Key Note Speech 2:
       Prof. Sebastián Martorell - Advanced analysis of reliability and risk of equipment subjected to degradation and obsolescence

10:00- 11:00   Key Note Speech 3:
       Prof. Marco Riani - Robust statics for big Data Analytics

11:00- 11:30   Coffee Break

11:30-12:00	Daniel Gaspar, Luís Ferreira	A proposal of an algorithm to simulation censored data right type I in reliability field
12:00- 12:30	Mohammad Raza	IOT future in Energy Industries

12:30- 12:45 - Thanks and End of the Seminar

12:45- 14:00   Lunch

Bibliographic notes about Key Note Speakers

Prof. Dr. Olga Fink, ETH Zurich

She is at the SNSF (Swiss National Science Foundation) and it is Professor for intelligent maintenance systems at ETH Zürich. Before, she was heading the research group "Smart Maintenance" at the Zurich University of Applied Sciences (ZHAW). Holds Ph.D. in civil engineering from ETH Zurich, and Diploma degree in industrial engineering from Hamburg University of Technology. Gained valuable industrial experience as reliability engineer for railway rolling stock and as reliability and maintenance expert for railway systems. Research focuses on Data-Driven Condition-Based and Predictive Maintenance, amongst others.

Prof. Sebastián Martorell, Universitat Politècnica de València

He is Full Professor of Nuclear Engineering, Director of the Radiation Service and Ex-Director of the Chemical and Nuclear Department at the Universitat Politècnica de València, Spain. Prof. Martorell received his Ph.D. in Nuclear Engineering from Universitat Politècnica de València in 1991. Head of the MEDASEGI research group, his research areas are probabilistic and deterministic safety analysis, uncertainties, risk-informed decision making, and RAMS modelling and optimization. In the past 27 years, he has served as consultant to governmental national and international agencies, nuclear facilities and private organizations in areas related to risk and safety analysis, especially applications to safety system design and testing and maintenance optimization of nuclear power plants. Prof. Martorell has taken part as Main Researcher in 64 national and international research projects and contracts. Prof. Martorell`s publications include 142 SCI and JCR papers in journals and proceedings of conferences in various areas of reliability, maintainability, availability, safety and risk engineering (h-index 21, about 1600 citations in WOS). He serves as a member of the Editorial Board of Reliability Engineering and System Safety International Journal. He is also an editorial board member of the Journal of Risk and Reliability, Proceedings of Institution of Mechanical Engineers, Part O. He has been Vice-Chairman of European Safety and Reliability Association (ESRA).

Prof. Marco Riani – University of Parma

He is a Full Professor of Statistics at the University of Parma, where he is teaching and research in Statistics and Informatics. Teaching has concerned courses at graduate, post graduate and PhD level. Supervisor of PhD students (two of them, namely Tiziano Bellini now at HSBC bank and Francesca Torti now at the Joint Research Centre of the European Commission won the prize for the best Italian PhD thesis in statistics). He is currently Director of the Interdepartmental center Ro.Sta.Bi.Da.C -– ROBUST STATISTICS FOR BIG DATA CENTRE of the University of Parma, Member of the Steering Committee of the SIS CLADAG (Classification and Data Analysis Group of the Italian

Statistical Society), member of the board of the PhD programme in Statistics and Financial Mathematics, University of Milan Bicocca, Italy, Member of the Steering Committee of ICORS (International Conference of Robust Statistics), Scientific coordinator of the module "Advanced personal computing" of the "Marketing Management Master" organized by the University of Parma jointly with financial Italian newspaper "Il Sole 24 Ore", and scientific coordinator of the module "Informative systems and statistics tools for market management" of the master in Agribusiness and Food Management organized by the University of Parma.

Registration and Seminar Fee

Registration will be accepted until the 11th October 2019.

A registration form and information package for the venue will be made available on the ESReDA website:

https://www.esreda.org/event/57th-esreda-seminar

The fees according to ESReDA's rules are:

- Speakers: one speaker per accepted paper may participate without paying seminar fees.
- ESReDA members: up to three participants of ESReDA members are taken in charge by organization.
- Participant: 300€ per participant.
- Accompanied persons for Gala Dinner: 50€ per participant

Fees are to be paid by bank transfer to ESReDA account:

Holder: ESReDA

Bank: BNP Paribas Fortis Bank, Boulevard Jamar 1 D, 1060 Bruxelles, Belgium

IBAN: BE69 0012 3728 1678

BIC: GEBABEBB

Subject: Registration to the 57th ESReDA Seminar

Organizers

Universitat Politècnica de València

The Universitat Politècnica de València is a public, dynamic and innovative institution, dedicated to research and teaching that, while maintaining strong links with the social environment in which it carries out its activities, opts for a strong presence abroad. It is a young university, which celebrates its 50th anniversary during the academic year 2018-2019.

Its community is made up of about 34,000 students, 3,600 professors and researchers and 1,500 administrative and service professionals distributed among its three campuses located in Alcoy, Gandia and València.

At present, the UPV is constituted by 13 university centers, of which 9 are higher technical schools, 2 are faculties and 2 are higher polytechnic schools. In addition, it has a Doctoral School and 3 affiliated centers (Florida University, Berklee College of Music and EDEM Business School).

The Seminar will be supported by C-Motores Termicos at the Universitat Politècnica de València:

CMT-Motores Térmicos is a research and educational center fully involved in the development of the future combustion engine, and incorporating more than 100 people. For more than 35 years have conducted basic research for better understanding the relevant physical processes involved, and applied studies for optimizing the engine behavior and assisting in its development.

From the deep scientific knowledge to the real-life problems of the automotive industry, we combine experimental tests conducted in our state-of-the-art facilities, and theoretical studies providing relevant technical and scientific results. Our interdisciplinary approach covers different research areas, and aims at Excellence and Innovation.

More information available in: https://www.cmt.upv.es/

ESReDA

ESReDA is a European Association which provides a forum for the exchange of information, data and current research in Safety and Reliability and a focus for specialist expertise.

The Safety and Reliability of processes and products are topics which are the focus of increasing interest Europe wide. Safety and Reliability Engineering is viewed as being an important component in the design of a system. However the discipline and its tools and methods are still evolving and expertise and knowledge dispersed throughout Europe. There is a need to pool the resources and knowledge within Europe and ESReDA provides the means to achieve this.

ESReDA was established in 1992 to promote research, application and training in Reliability, Availability, Maintainability and Safety (RAMS). The Association provides a forum for the exchange of information, data and current research in Safety and Reliability and a focus for specialist expertise.

More information at:

https://www.esreda.org/

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Lithuania
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ESReDA Project Group on Big Data, Reliability, Risk and Safety Analysis

The project group (PG) "Big Data, Reliability, Risk and Safety Analysis" aims to write a working technical document, if possible a book, in which it will try to identify the evolutions, paradigm shift and challenges caused by the emergence of Big Data in the Reliability, Risk and Safety Analysis of industrial equipment.

In doing so, the PG will attempt to identify the advantages and disadvantages of its use for equipment users by identifying the techniques to be applied, the standardization needs (if any) and the existing challenges to an application of new scientific knowledge in these areas.

We expect that this technical document will be published with a EUR Tech-Doc reference number.

Venue

Valencia

The port city of Valencia lies on Spain's southeastern coast, where the Turia River meets the Mediterranean Sea. It's known for its City of Arts and Sciences, with futuristic structures including a planetarium, an oceanarium and an interactive museum. Valencia also has several beaches, including some within nearby Albufera Park, a wetlands reserve with a lake and walking trails.

Valencia is a very touristic city with a great offer of hotels.