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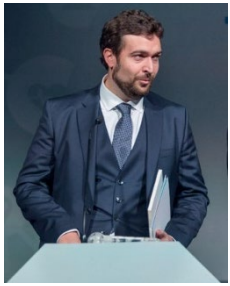
Keynote Speaker



Alessandro Golkar
Associate Professor, Skoltech, Russia

Bio:
Space Systems Engineer, Alessandro Golkar is Associate Professor at the Skolkovo Institute of Science and Technology (Skoltech), an international research university in Moscow, Russia, founded in 2011 in collaboration with the Massachusetts Institute of Technology (MIT). From April 2017-2019, Alessandro Golkar was on leave from Skoltech as Vice President Concurrent Engineering, part of the Leadership Team of Technology Planning and Roadmapping at the Airbus Corporate Technology Office (CTO) in Toulouse, France. His research looks at new ways for looking at complex systems architecting problems, understanding the evolution of technology, and developing research and demonstrators of novel space mission concepts and spacecraft payload systems.

He pursued his Ph.D. in Aeronautics and Astronautics at the Massachusetts Institute of Technology (MIT), and Master's and Bachelor's degrees in aerospace engineering at Università di Roma "La Sapienza".

Special Sessions

Resilience of Agent Systems: Modeling, Design and Operation Management
Organizers: Chris Zhang, Professor, Department of Mechanical Engineering, University of Saskatchewan, Canada
Lida Xu, PhD, IEEE Fellow, Professor, Old Dominion University

Aims of the session:
A generic model of many complex dynamic systems is that the system consists of a group of agents, which could be intelligent and non-intelligent. The word 'intelligent' refers to being able to learn, to change, and to making decision, while the word 'non-intelligent' refers to missing one, two or all of the three intelligent behaviors. The complexity refers to uncertainty of changes in the structure of each agent and the communication among agents. It is worth to mention that such a system differs from traditional multi-agent systems, in which all agents are intelligent, in that in such a system, non-intelligent agents need "help" from intelligent agents. Such a system may be called the under-intelligent agent system.

Resilience of a system makes sense to the ability of a system on its own resource to recover from an unexpected partial damage of the system and/or unexpected damage of environments according to [1, 2]. How to model, design and manage the operation of both intelligent agent systems and under-intelligent agent systems to improve their resilience is an important question. The management of operation includes planning, scheduling, coordination and execution.

The purpose of this special session is to bring together researchers to share knowledge of design and operation management of both under-intelligent agent systems and intelligent agent systems.Type something to get started

Certification of Systems
Organizer: Rob Vingerhoeds, Professor of Systems Engineering, Head of the Department of Complex Systems Engineering, ISAE-SUPAERO, Université de Toulouse

Aims of the session:
Topic important for safety-critical embedded systems, such as aerospace systems and nuclear systems, but also in medical engineering and more in general the validation of embedded systems. Systems engineering brings more and more methods and tools into the development of critical systems, aiming particularly at safety, reliability, and security.

The special session proposes to bring together contributions on modelling and integration of models (model driven approaches), formal approaches, proofs, simulation, integration of processes, etc for certification of such critical systems.

The best papers of the session will be invited to extend their paper for development into a full journal paper for a special issue on the same theme.

Theoretical Foundations of System Engineering (THEFOSE)
Organizer: Omar Hammami, ENSTA PARIS, 828, Bvd des Maréchaux, 91762, Palaiseau cedex, France

Aims of the session:
System engineering has experienced multiple successes over the years in various industrial projects with a strong emphasis in defense and aerospace. Recently, system engineering have gained several contributions from theory however the field still lacks a strong theoretical foundation. This request for more theoretical foundations come from both academia and industry in order to make the best of system engineering practices and experience in increasingly multidisciplinary projects. Several research topics need to be addressed such as formal definitions of system engineering terms and concepts, systems semantics, complexity theory of multidisciplinary systems, formal analysis of system engineering processes and standards but also all theoretical computer science impacts on languages and tools used by system engineers. This session contributors will also provide papers discussing the integration of quantitative methods into MBSE methods and processes (MBSE-MDO continuity). Examples of quantitative methods include formal methods, value driven design, petri-nets, SoS design space optimization(MDA/MDO), Multidisciplinary exploration, Models /meta models and multifidelity, Ontologies foundations and integration, etc.

This session will also accept papers on mathematical optimization and agility and hybrid online machine learning for modelling, optimization and Data-Mining.

Finally, the session will also call for papers proposing new research directions and tutorial papers in the theoretical foundations of system engineering.

Reliability, Availability, Maintainability, and Safety (RAMS) in Systems Engineering : new perspectives for research and industry
Organizer: Dr. Lorenzo Ciani, University of Florence, Italy

Nowadays in many contexts it is mandatory to fulfill performance of Testing and Diagnostics, Reliability, Maintainability, Safety and Risk assessment. Such tasks play a fundamental role in different fields of application (energy, transportation, information and communication technology, logistics, etc.) and are considered as fundamental in high-tech industry and plants. This Special Session represents an interesting opportunity for engineers and researchers who work in this area to meet and discuss about live issues. In particular, useful and beneficial discussion can be promoted with the aim to provide an increasing of knowledge and an easier diffusion of the most recent developments.

Prospective authors can provide original contributions in this topic which can cover, but not only, the following aspects:

- Testing and Diagnostics (Destructive and Non-destructive Testing, Vibration monitoring, Built-in Test Equipment and Automatic Test Equipment, etc.) in the design of complex systems
- Condition monitoring and maintenance of industrial process, plants and complex systems
- Fault detection and diagnosis in Systems Engineering
- Evaluation of Reliability, Availability, Maintainability and Safety (RAMS), Risk assessment and management for Systems Engineering

- Impact of RAMS requirements in systems application devoted to Life and Society, environment and new energy source

Technical Program

Cyber Security and Complex Systems

A Strongly Non-Intrusive Methodology to Monitor and Detect Anomalous Behaviour of Wireless Devices
Parth Shah (University of Waterloo, Canada)
Abdurhman Albasir (University of Waterloo, Canada)
Ricardo Manzano (University of Waterloo, Canada)
Kshirasagar Naik (University of Waterloo, Canada)
Nitin Naik (Ministry of Defence, United Kingdom (Great Britain))

When Mini-AES Meets Machine Learning: Practice and Experience
Xian Liu (University of Arkansas at Little Rock, USA)

An Architecture-based Modeling Approach Using Data Flows for Zone Concepts in Industry 4.0
Matthias Kern (FZI Research Center for Information Technology, Germany)
Emre Taspolatoglu (FZI Research Center for Information Technology, Germany)
Fabian Scheytt (FZI Research Center for Information Technology, Germany)
Thomas Glock (FZI Research Center for Information Technology, Germany)
Bo Liu (FZI Research Center for Information Technology, Germany)
Victor Pazmino Betancourt (FZI Research Center for Information Technology, Germany)
Eric Sax (FZI Research Center for Information Technology, Germany)
Juergen Becker (Karlsruhe Institute of Technology, Germany)

Governing Principles of Self-Sovereign Identity Applied to Blockchain Enabled Privacy Preserving Identity Management Systems
Nitin Naik (Ministry of Defence, United Kingdom (Great Britain))
Paul Jenkins (University of Portsmouth & Ministry of Defence, United Kingdom (Great Britain))

Comparative Analysis of Cyber Security Approaches Using Machine Learning in Industry 4.0
Sumeyye Cebeloglu (Firat University, Turkey)
Mehmet Karakose (Firat University, Turkey)

uPort Open Identity System: An Assessment of Self-Sovereign Identity and User-Centric Data Platform Built on Blockchain
Nitin Naik (Ministry of Defence, United Kingdom (Great Britain))
Paul Jenkins (University of Portsmouth & Ministry of Defence, United Kingdom (Great Britain))

Energy Management and Sustainability

Economic Load Dispatch with Short-Term Wind Power: Machine Learning through Radial Basis Neural Network
Xian Liu (University of Arkansas at Little Rock, USA)

Attack-Resilient Smart Grid Dynamic State Estimation Algorithm
Md Rana (University of Houston, USA)
Ahmed Abdelhadi (University of Houston, USA)

Emulation Modeling on Rebound-Compensated Aggregation of Uncertain Demand Responses from a Large Number of Building Air-Conditioners
Chuzo Ninagawa (Gifu University, Japan)
Asif Iqbal (Gifu University, Japan)

Yoshifumi Aoki (Gifu University, Japan)
Junji Morikawa (Mitsubishi Heavy Industries, Ltd., Japan)
Seiji Kondo (Mitsubishi Heavy Industries, Ltd., Japan)

Multiple MPPT based String Inverter effect on Annual performance: Observations at Utility scale Solar PV Plants
Alpesh Desai (Pandit Deendayal Petroleum University, India)

Engineering Processes for Complex Systems

Resilience of Agent Systems: Modeling, Design and Operation Management
Wenjun Zhang (University of Saskachewan, Canada)

Performance Assessment of Agile Hardware Co-development Process
Nicola Garzaniti (Skolkovo Institute of Science and Technology, Russia)
Alessandro Golkar (Skolkovo Institute of Science and Technology, Russia)

Integrated design methodology for improved system manufacturability
Arzu Kurgan (Skolkovo Institute of Science and Technology, Russia)
Paolo Maggiore (Politecnico di Torino, Italy)
Alessandro Golkar (Skolkovo Institute of Science and Technology, Russia)

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Mohsen Memaran (Politecnico di Torino, Italy)
Cristiana Delprete (Politecnico di Torino, Italy)
Eugenio Brusa (Politecnico di Torino, Italy)
Abbas Razavykia (Politecnico di Torino, Italy)
Paolo Baldissera (Politecnico di Torino, Italy)

Quantification of Quality and Efficiency Improvements by Implementing 5G-Technology in a Networked, Adaptive Production
Raphael Kiesel (Fraunhofer Institute for Production Technology IPT, Germany)
Philipp Hemmers (Fraunhofer Institute for Production Technology IPT, Germany)
Robert Schmitt (Laboratory for Machine Tools and Production Engineering WZL, Germany)

Towards defining role models in Advanced Systems Engineering
Eva-Maria Grote (Fraunhofer-Einrichtung für Entwurfstechnik Mechatronik IEM, Germany)
Stefan Achilles Pfeife (Fraunhofer-Einrichtung für Entwurfstechnik Mechatronik IEM, Germany)
Daniel Röltgen (Fraunhofer-Einrichtung für Entwurfstechnik Mechatronik IEM, Germany)
Arno Kühn (Fraunhofer-Einrichtung für Entwurfstechnik Mechatronik IEM, Germany)
Roman Dumitrescu (Fraunhofer-Einrichtung für Entwurfstechnik Mechatronik IEM, Germany)

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Charles Pickar (Naval Postgraduate School, USA)

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Leandro Batista (Institute Polytechnique de Paris, The Netherlands)
Bruno Monsuez (ENSTA ParisTech, France)

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Victor Pazmino Betancourt (FZI Research Center for Information Technology, Germany)
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Model-Based Systems Engineering

Improving OPM Conceptual Models by Incorporating Design Structure Matrix
Gil Sobol (Technion - Israel Institute of Technology, Israel)
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Modeling and Simulation

A contribution to Commissioning as enabler of nuclear infrastructure delivery: Tests and trials program elaboration and management
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Victor Richet (Technical Lead, France)
Robert Plana (Laas-cnrs, France)

Using a model-based engineering approach for developing Industrial Internet of Things applications
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Christian Neureiter (Salzburg University of Applied Sciences, Austria)

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Roshanak Rose Nilchiani (Stevens Institute of Technology, USA)
Christine Edwards (Lockheed Martin & Stevens Institute of Technology, USA)

System Design and Simulation of a Human Electric Hybrid Vehicle in AVL CRUISE
Mehmet A. Ongun (AVL Research and Engineering, Turkey)
Utku Kiran (AVL Research and Engineering, Turkey)
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Marian Göllner (Ostfalia University of Applied Sciences, Germany)
Sven Jacobitz (Ostfalia University of Applied Sciences, Germany)
Soeren Scherler (Ostfalia University of Applied Sciences, Germany)
Jie Zhang (Ostfalia University of Applied Sciences, Germany)
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