ESReDA
European Safety, Reliability & Data Association

UGA
Université Grenoble Alpes

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

present

60th ESReDA Seminar

ADVANCES IN MODELLING TO IMPROVE NETWORK RESILIENCE

4th & 5th May 2022

Grenoble, France

Final programme and event information
esreda.org/event/60th-esreda-seminar &
risk.univ-grenoble-alpes.fr

Risk
Université Grenoble Alpes

GRENOBLE INP UGA Ense3

European Commission

Affiche: Conception réalisation : Sylvie Perrier/RISK@UGA

FINAL PROGRAMME

Location: GreEN-ER Building
21 Avenue des Martyrs - CS 90624
38031 GRENOBLE CEDEX 1
Grenoble

Tuesday 3rd May 2022: Project Group Meetings, plus ESReDA Board of Directors Meeting

Day 1 – Wednesday 4th May 2022			Day 2 – Thursday 5th May 2022	
09h00 - 09h35	Coffee and registration		08h45 – 09h15	Welcome coffee
09h35 - 10h05	Welcome		09h15 – 10h00	Keynote Lecture 2
10h05 - 10h50	Keynote Lecture 1		10h00 – 11h00	Session 4
10h50 - 11h20	Coffee break		11h00 – 11h30	Coffee break
11h20 - 12h20	Session 1		11h30 – 12h30	Session 5
12h20 - 14h00	Lunch		12h30 – 14h00	Lunch
14h00 - 15h40	Session 2		14h00 – 15h00	Session 6
15h40 - 16h00	Coffee break		15h00 – 15h20	Seminar close
16h00 - 17h00	Session 3			
17h00 - 18h30	ESReDA General Assembly			
20h00	Seminar dinner			

Scope of the seminar

Scope of the Seminar

In resilience engineering, failure is an inability to adapt to disruptions rather than a breakdown or malfunction, as is commonly the case in traditional risk analysis. Resilience encompasses the phases of avoiding (being proactive against the occurrence or consequences), absorbing (withstanding without reconfiguration), adapting to (reconfiguring) and recovering from disruptions (restoring the pre-disruption state as closely as possible).

Modern engineering systems continually increase in size and complexity, whilst also becoming more distributed, integrated, and autonomous, all of which can lead to many safety and risk management challenges. There is a constant, relentless pursuit of cheaper, more efficient, optimised performance, which can inadvertently introduce system vulnerabilities and potentially erode safety margins. Threats constantly evolve and emerge, with recent years seeing numerous failures of aging infrastructure, catastrophic events following natural disasters or due to the effects of climate change, and major disruption caused by deliberate acts such as terrorism and cyber or hybrid attacks. Increasingly automated and software-intensive infrastructure can struggle to adapt to unanticipated situations and can hence be extremely vulnerable to emergent threats. Coupling this with the growing complexity and interdependencies between infrastructure assets, it is clear that there is an urgent need for new approaches to protect these critical systems.

Many of the critical infrastructure systems on which modern society is so dependent are networks. These include transport networks (rail, metro, highway, air traffic and shipping routes), utilities (electricity, gas, water) and communications (mobile phone, land line phones, internet). The disruption of such systems can have a big impact on the communities that they serve. Such critical systems must be resilient. It is important to understand the characteristics of such networks and the methods that exist to model their resilience and to identify their weaknesses so that efforts are targeted at those places that will most protect network performance.

The 60th ESReDA seminar will be a forum for exploring these and other related issues. We aim to discuss theories, concepts, and experiences of methods for improved network resilience. Authors are invited to present their research and experience and discuss challenges in enhancing resilience through modelling. We are encouraging new ideas, case studies and cross-sectoral and inter-disciplinary research on the theme of network resilience. This seminar will bring together researchers, practitioners, specialists and decision-makers to discuss strategies and practical experiences.

Target groups and domains of application

Papers or extended abstracts for the seminar have been invited from various stakeholders, from practitioners to researchers (industrialists, regulators, safety boards, universities, R&D organisations, engineering contractors and consultants, training specialists) and address different sectors:

- Transport: rail, road, air and maritime
- Critical infrastructure: electricity, water, telecommunications, information systems
- Urban planning and management
- Public sector and government.

This seminar is aimed at addressing resilience due to different threats, such as failures of aging infrastructure, natural disasters and climate change, intentional attacks (cyber-security and terrorism), and emerging threats, met by different industries, critical infrastructures and urban settlements.

Day 1: Wednesday 4th May, 2022

09h00-09h35	**Registration and welcome coffee**
09h35-10h05	Welcome to participants from; Mohamed Eid - President of ESReDA, Julien Baroth - Université Grenoble Alpes, and Rasa Remenyte-Prescott - Chairperson of the Conference
10h05-10h50	**Keynote lecture:** **"Risk and Resilience of Infrastructure Systems"** by Anne Barros, CentraleSupélec, France Chair: Stefan Schauer
10h50-11h20	**Coffee Break**
11h20-12h20	**Session 1: Resilience of Electrical Networks** Chair: Vytis Kopustinskas
1h *(20' each including questions)*	**"Improving Power System Frequency Response with a Novel Load Shedding Method",** (paper 2) by Andrejs Utans*, Antans Sauhats*, Laila Zemite*, Dimitrijs Guzs**; *RTU, Latvia; **AST, Latvia
	"Improved Modeling of Fault Propagation, Isolation, and Fast Service Restoration in Smart Grids", (paper 8) by Youba Nait Belaid, Yiping Fang, Zhiguo Zeng, Anne Barros; CentraleSupélec, France
	"Bayesian Updating and Reliability Analysis for Nuclear Containment Buildings", (paper 5) by Donatien Rossat*, Julien Baroth*, Frédéric Dufour*, Matthieu Briffaut*, Benoît Masson**, Alexandre Monteil**, Sylvie Michel-Ponnelle**; *Grenoble INP, France; **EDF, France.
12h20-14h00	**Lunch**
14h00-15h40	**Session 2: Infrastructure Resilience to Natural Hazards** Chair: Christophe Berenguer
1h40	**"A Simulation Approach for Evaluating Interventions to Improve the Resilience of Transport Networks Against Climate-Induced Hazards",** (paper 1) by Hossein Nasrazadani*, Bryan Adey*, Saviz Moghtadernejad* and Alice Alipour**; *ETH Zurich, Switzerland; **Iowa State University, USA
	"The prevention of NATECH risks on the Italian territory: the importance of the Safety Management System", (paper 16) by Romualdo Marrazzo, Fabrizio Vazzana; Ispra, Italy (Virtual Presentation)
	"An Overview of Causes of Landslides and Their Impacts on Transport Networks", (paper 14) by Kwan Ben Sim*, Min Lee Lee*, Rasa Remenyte-Prescott**, Soon Yee Wong*; *University of Nottingham, Malaysia; **University of Nottingham, UK

(20' each including questions)	**"Risk and Resilience in Practice: A Methodology for Implementation of Mountain Risk Management and Prevention Strategy (StePRiM)"**, (paper 10) by Jean-Marc Tacnet*, Simon Carladous**, François Sassus**, Eva Ripert***, Patrick Lagleize***, Ariane Stephan****, Catherine Calmet**** *Grenoble INRAE, France; **Office National des Forêts, France; ***Communauté de Communes Pyrénées Haut Garonnaises, France; ****Ministère de la Transition Ecologique, France
	"Decision-Aiding Towards Improved Resilience of a Deteriorating Debris Retention Dam Subject to Maintenance Strategies", (paper 11) by Nour Chahrour*, Guillaume Piton**, Jean-Marc Tacnet**, Christophe Bérenguer*; *Grenoble INP, France; **Grenoble INRAE, France
15h40-16h00	**Coffee Break**
16h00-17h00	**Session 3: Resilience Evaluation** Chair: Anne Barros
1h *(20' each including questions)*	**"Definition and Nature of Resilience"**, (paper 3) by Yves Merian; IMdR, France
	"Study of a degrading system with stochastic arrival intensity subject to CBM", (paper 9) by Lucia Bautista Bárcena, Inmaculada T. Castro, Luis Landesa Porras; University of Extremadura, Spain
	"A Simulation-driven Tool for Supporting Risk and Resilience Assessment in Cities", (paper 12) by Stefan Schauer*, Thomas Hiebl**, Stefan Rass***, Sandra König*, Martin Latzenhofer*; *AIT, Austria; **Cubido Business Solutions, Austria; ***Universitaet Klagenfurt, Austria.
17h00-18h30	**ESReDA General Assembly**
20h00	**Seminar Dinner –** Restaurant at Le Pèr'Gras 90, Chemin de La Bastille 38700 La Tronche Mail: restaurant@pergras.fr T. 04 76 42 09 47

Day 2: Thursday 5th May 2022

08h45-09h15	**Welcome coffee**
09h15-10h00	**Keynote lecture:** **"The Resilience Performance Assessment (RPA): A Framework and Decision-Making Tool to Evaluate and Follow the Resilience of Infrastructures and Territories"** by Philippe Sohouenou, Resalliance, France Chair: Mohamed Eid
10h00-11h00	**Session 4: Resilience of Transport Networks and Smart Cities** Chair: Bryan Adey
1h *(20' each including questions)*	**"Resilience and Capacity in Networks - A comparative Investigation of Rail Transport Networks and Electric Power Grids",** (paper 18) by Pierre Dersin; Luleå University of Technology, Sweden
	"Simulation Supported Bayesian Network Approach for Performance Assessment of Complex Bridge Network Systems", (paper 6) by Mohsen Songhori, Claudia Fecarotti, Geert-Jan van Houtum; Eindhoven University of Technology, The Netherlands
	"A Study on Resilience Index for Transport Infrastructure in China", (paper 20) by Chao Yang*, Rasa Remenyte-Prescott**; *China Transportation Institute, Tongji University, China; **University of Nottingham, UK
11h00-11h30	**Coffee Break**
11h30-12h30	**Session 5: Resilience of Utility Networks** Chair: Julien Baroth
1h *(20' each including questions)*	**"Real-time Monitoring of Gas Pipelines with Leak Detection and Localization via a Receding Horizon Observer",** (paper 4), by Didier Georges; Grenoble INP, France
	"Gas Network Modelling to Support Pipeline Hub Area Risk Assessment", (paper 21) by Vytis Kopustinskas*, Bogdan Vamanu**, Sebastian Ganter***, Jörg Finger***, Ivo Häring***, Ivars Zalitis****, Laila Zemite****; *European Commission, Joint Research Centre (JRC), Ispra, Italy; **Horia Hulubei National Institute of Physics and Nuclear Engineering, Romania; ***Fraunhofer Institute for High-Speed Dynamics, Germany; ****Riga Technical University, Institute of Power Engineering, Latvia

	"Influence of Availability Transients on Network Resilience", (paper 17) by Christian Tanguy; Orange Labs, France
12h30-14h00	**Lunch**
14h00-15h00	**Session 6: Resilience of Infrastructure Networks** Chair: Jean-Marc Tacnet
1h *(20' each including questions)*	**"Applying Deep Reinforcement Learning to Improve the Reliability of an Infrastructure Network",** (paper 7) by Jose Carlos Hernandez Azucena, Haitao Liao, Henley Wells, Kelly Sullivan, Ed Pohl; University of Arkansas, USA. (Virtual Presentation)
	"Interdependencies of Infrastructures in Smart Cities and Advanced Topological Approach for the Resiliency of Coupled Systems - Example of Power and ICT systems", (paper 19) by Raphael Caire; Grenoble INP, France.
	"Risk Management with Multi-Categorical Risk Assessment", (paper 13) by Sandra König*, Stefan Schauer*, Mona Soroudi**, Ili Ko**, Paraic Caroll**, Daniel McCrum**; *AIT, Austria; **University College Dublin, Ireland
15h00-15h20	**Conference Closure**

Seminar Organization
The Seminar is jointly organised by ESReDA and Univ. Grenoble Alpes

Location
Grenoble, GreEn-ER building

Chairperson of the Seminar

REMENYTE-PRESCOTT Rasa	(University of Nottingham, UK)

Technical Programme Committee (TPC)

ANDREWS John	(University of Nottingham, UK)
BAROTH Julien	(Université Grenoble Alpes, 3SR, France)
BASTEN Rob	(Eindhoven University of Technology, Netherlands)
BERENGUER Christophe	(Université Grenoble Alpes, GIPSA-lab, France)
DUNNETT Sarah	(Loughborough University, UK)
EID Mohamed	(ESReDA President, Consultant at RiskLyse, France)
FECAROTTI Claudia	(Eindhoven University of Technology, Netherlands)
JACKSON Lisa	(Loughborough University, UK)
JUDEK Clement	(IMDR, France)
KOPUSTINSKAS Vytis	(European Commission, Joint Research Centre – Ispra, Italy)
LANNOY Andre	(IMDR, France)
LIU Yiliu	(Norwegian University of Science and Technology, Norway)
OTTENBURGER Sadeeb Simon	(Karlsruhe Institute of Technology - KIT, Germany)
POHL Ed	(University of Arkansas, USA)
SARUNIENE Inga	(Lithuanian Energy Institute, LEI)
SCHAUER Stefan	(Center for Digital Safety & Security, Austrian Institute of Technology, Austria)
TACNET Jean Marc	(Université Grenoble Alpes, INRAE, ETNA, France)
TUBIS Agnieszka	(Wroclaw University of Science and Technology, Poland)
UTANS Andrejs	(Riga Technical University, Latvia)
VAN HOUTUM Geert-Jan	(Eindhoven University of Technology, Netherlands)
YUSTA Jose Maria	(University of Zaragoza, Spain)

Opening of the Seminar: **4th May 2022**
Closing of the Seminar: **5th May 2022**

Local Organization Committee:

BAROTH Julien	(UGA) – Local Organizing Committee chairperson
BERENGUER Christophe	(GINP)
CHAHROUR Nour	(INRAE)
TACNET Jean-Marc	(INRAE)
PERRIER Sylvie	(UGA)

Registration and Seminar Fee
Registration is strongly encouraged by 15th April 2022. A registration form and information package for the venue can be downloaded from the ESReDA website.

The registration fees are 100 € for PhD students and 300 € for others. Fees are to be paid by bank transfer to ESReDA:

Holder: ESReDA
Bank: BNP Paribas Fortis Bank, Boulevard Jamar 1 D, 1060 Brussels, Belgium
IBAN: BE69 0012 3728 1678
BIC: GEBABEBB
Subject: Registration to the 60th ESReDA Seminar
Fee waiver:

- One speaker per accepted paper is free of seminar fees.
- Maximum 3 participants per ESReDA member organisation are exempted of fees.

About European Safety, Reliability & Data Association (ESReDA)

European Safety, Reliability & Data Association (ESReDA) is a European Association established in 1992 to promote research, application and training in Reliability, Availability, Maintainability and Safety (RAMS). ESReDA is an international non-profit association with approximately 35 member organizations comprising companies from different industries, research organizations and universities working within the safety and reliability field.

ESReDA aims to promote the development and the exchange of data, information and knowledge through the promotion of Project Groups (PG) on subjects related to Reliability, Safety and Data Analysis. In this PG's some of the best world specialists in these subjects are able to meet and, in a first time, to aggregate their knowledge and then to disseminate it for the sake of the scientific and technological communities in Europe and around the World. This dissemination can be made by organizing seminars twice per year and publishing the most important results of the Project Groups. 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 membership is open to organisations, privates or governmental institutes, industry researchers and consultants, who are active in the field of Safety and Reliability. Membership fees are currently 1000€ for organisations and 500€ for universities and individual members. Special sponsoring or associate membership is also available.

For more information on ESReDA, contact: Inga.Saruniene@lei.lt ESReDA General Secretary, Dr. Inga Šarūnienė (Lithuanian Energy Institute, Lithuania).

60th ESREDA Seminar venue

GreEN-ER Building
21 Avenue des Martyrs - CS 90624
38031 GRENOBLE CEDEX 1
Grenoble
GPS : Latitude 45.202629° ; Longitude 5.703911°

https://www.grenoble-inp.fr/fr/acces-itineraires/batiment-green-er
https://ense3.grenoble-inp.fr/en/about-us/location

Travel Information

By plane : Grenoble can be reached mainly from Lyon Airport or Geneva Airport.

- Lyon airport, also known as Saint Exupéry, is about 100 km away (1 h by bus, car or train). Busses go hourly to Grenoble.
- Geneva Airport, 157 km from Grenoble, is a common destination of many airlines companies. From the airport, Grenoble can be reached by car in 1H30 mns ; by train (several times daily), it takes about 2 hours ; there are also direct busses to Grenoble.
  Remember that Geneva is a Swiss city and depending on your country of origin you may need a visa. Since 2008 Switzerland is part of the Schengen area. European Union citizens should not have problems travelling via Geneva. It is also worth remembering that Switzerland has its own currency (the Swiss Franc); nearly all retail outlets in Geneva accept Euros but change is given in Swiss Francs. Geneva Airport also has a “French part” that does not require to enter into Swiss territory if you come from France and your destination flight is to France.

Grenoble Isère Airport, also known as St Geoirs, about 40 km from Grenoble, or about 35 minutes by coach. This is a small low-cost airport. Flights are available only during the ski season. EasyJet and Ryanair offer flights to/from Grenoble Isère Airport.

By train : Grenoble can also easily be reached by train : Several high speed trains (TGV) from SNCF link Paris to Grenoble directly every day, for a three-hour trip of 640 km. TER trains also link the city to Geneva in Switzerland (2h), to southern Alps (Gap, Sisteron) and to Valence (1h) where you can change for the TGV to Southern-France. More info on SNCF website.

See also Grenoble in wikitravel : https://wikitravel.org/en/Grenoble

Grenoble Tourist Information
https://www.grenoble-tourisme.com/en/

Grenoble tramway information
https://www.tag.fr/67-un-tarif-pour-chacun.htm

Accomodation proposal

- ⇨ *When booking your hotel, please mention that you are calling **from the Convention Bureau** of the Grenoble Tourist Office.*
- ⇨ *To help you choose your hotel booking area, please see the general map attached.*

A/ Historic Center

. Gren-ER - Esreda seminar site: 20mn by tramway B, station « Marie-Louise Paris-CEA ».
. Expected gala dinner site: direct walking distance.

HÔTEL D'ANGLETERRE***
GRENOBLE HYPER-CENTRE
5 place Victor Hugo - GRENOBLE
+33438884040
reservations@hotel-angleterre-grenoble.com
Website

HÔTEL DE L'EUROPE***
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22 place Grenette - GRENOBLE
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HÔTEL IBIS GRENOBLE***
CENTRE BASTILLE
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Website

LE GRAND HÔTEL****
GRENOBLE CENTRE
5 rue de la République - GRENOBLE

+33476512259
contact@grand-hotel-grenoble.fr
Website

B/ Station Area

. Gren-ER - Esreda seminar site: 10mn by tramway B, station « Marie-Louise Paris-CEA ».
. Expected gala dinner site (Historic center): 10mn by tramway A&B, station « Halles Sainte-Claire ».

HÔTEL GLORIA**
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Website

NOVOTEL GRENOBLE CENTRE**
5-7 place Robert Schuman - GRENOBLE
+33476708484
h1624@accor.com
Website

C/ Boulevard area, Hotels ****

. Gren-ER - Esreda seminar site : 10mn by tramway A, station « Alsace Lorraine » + 10mn by tramway B, station « Marie-Louise Paris-CEA ».
. Expected gala dinner site (Historic center): direct walking distance or 10mn by tramway A, station « Maison du Tourisme ».

MERCURE GRENOBLE CENTRE ALPOTEL**
12 boulevard Maréchal Joffre - GRENOBLE
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PARK HÔTEL MGALLERY - HOTEL COLLECTION**
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Website

For any question on the conference logistics, please e-mail Sylvie Perrier at sylvie.perrier@univ-grenoble-alpes.fr