

# JCSS Continuing Education & Advanced School

**Structural Reliability and Probabilistic Model Code &  
Risk Informed Decision Making and Decision Analysis**

**12 July – 17 July, 2021  
Shanghai, China**

## **Organized by**

**The Joint Committee on Structural Safety (JCSS)  
Tongji University  
Harbin Institute of Technology  
Beijing University of Technology**

## **Co-Organized by**

**International Joint Research Center for Engineering Reliability and Stochastic  
Mechanics  
Committee on Random Vibration, Chinese Society of Vibration Engineering  
Talent Working Committee, Chinese Society of Vibration Engineering  
The Committee on Probability and Statistics in the Physical Sciences, the Bernoulli  
Society for Mathematical Statistics and Probability**

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### Increased Interest In Risk and Reliability

Methods of reliability, risk and safety assessment are increasingly gaining importance as decision support tools in various fields of engineering. In order to utilize these methods and to exploit their potential in industrial applications, an understanding of the fundamental principles is necessary. The Advanced School aims at educating engineers and researchers to work more efficiently in supporting decision makers and clients for a sustainable societal development.

### JCSS

The JCSS is a committee in the field of Structural related Risk and Reliability, acting on behalf of the Liaison Committee of the following six international professional associations:

- CIB International Council for Research and Innovation in Building and Construction
- ECCS European Convention for Constructional Steelwork
- fib International Federation for Structural Concrete
- IABSE International Association for Bridge and Structural Engineering
- RILEM Reunion internationale des Laboratoires et Experts des Matériaux
- IASS International Association for Shell and Spatial structures

The goals of the JCSS are:

- To improve the general knowledge and understanding within the fields of safety, risk, reliability and quality assurance, for all types of civil engineering and building structures, on the basis of sound scientific principles and with an open eye for the applications in practice.
- To take care that inter-associational pre-normative research in the field of Risk and Reliability is performed in an effective and adequate way.

### JCSS Advanced School Description

The JCSS Continuing Education and Advanced School provides a deep and thorough insight in the latest developments in the concepts and tools for probabilistic structural reliability engineering and risk informed decision making. The advanced school consists of 3 courses which will be held consecutively:

Part 1: Probabilistic Modelling and Risk Analysis in Engineering (28 June – 3 July 2018, Tongji University, Shanghai, China)

**Part 2: The JCSS Probabilistic Model Code (12 July – 17 July 2021, Tongji University, Shanghai, China)**

**Part 3: Risk Informed Decision Making and Decision Analysis (12 July – 17 July 2021, Tongji**

University, Shanghai, China)

## Benefits

The participants benefit by becoming able to master the methods of reliability, risk and safety assessment for engineering projects. Furthermore, the participants can offer clients new services in the perspective of benefit and risk informed decision support.

## Who should attend?

Engineers involved in probabilistic structural analysis, design and reliability assessment, as well as engineering supervisors and managers will benefit from this course. Further, master and PhD students and academics working in the field of structural risk assessment will profit from this course. Participants are expected to have basic knowledge on basic probability theory, statistics, linear algebra and elementary structural analysis (static/dynamic).

## Information and course plan Part 2 & Part 3 Structural Reliability and JCSS Probabilistic Model Code & Risk Informed Decision Making and Decision Analysis

## Time and Location

The course on Structural Reliability and JCSS Probabilistic Model Code & Risk Informed Decision Making and Decision Analysis will be held from **12 July to 17 July, 2021**. The course location will be at **Tongji University**.

## Learning Methods and Activities

Learning methods and activities comprise lectures, practical exercises and self-studies. Self-study assignments will typically consist of calculations that develop understanding of the materials presented in class. Participants will be made familiar with the state-of-the-art computational methods and software in this field.

## Evaluation and Diploma

Course Diplomas are issued by the JCSS on the basis of active course participation and a positive evaluation of the provided material by the participant.

## Course Materials

Course compendium, books, selected research reports and papers from journals and conferences.

## Lecturers



**Michael H. Faber**, President of JCSS  
Member of Danish Academy of Technical Sciences  
Professor of Risk and Safety  
Department of Built Environment, Aalborg University, Denmark  
A. Cornell Award recipient (bestowed by the International Society for Civil Engineering Risk and Reliability (CERRA))



**J. D. Sørensen**, Former President of JCSS  
Professor  
Department of Built Environment, Aalborg University, Denmark  
Member of Board of Directors, International Civil Engineering Risk and Reliability Association (CERRA)



**Jochen Köhler**, Rapporteur of WP1 of JCSS  
Professor  
Department of Structural Engineering, Faculty of Engineering  
Norwegian University of Science and Technology (NTNU), Norway



**Jie Li**, President of the International Association for Structural Safety and Reliability (IASSAR)  
Distinguished Professor  
College of Civil Engineering, Tongji University, China  
Director, International Joint Research Center for Engineering Reliability and Stochastic Mechanics (CERSM)  
A. Freudenthal medal recipient (bestowed by ASCE)



**Yangang Zhao**  
Foreign Associate of Engineering Academy of Japan  
Professor  
Kanagawa University, Japan



**Jianbing Chen**, Member of JCSS  
Distinguished Professor  
College of Civil Engineering, Tongji University, China  
Member of Board of Directors, International Civil Engineering Risk and Reliability Association (CERRA)



**Dagang Lu**, Member of JCSS  
Professor  
School of Civil Engineering, Harbin Institute of Technology, China



**Zhaohui Lu**, Member of JCSS  
Professor  
Faculty of Architecture, Civil and Transportation Engineering, Beijing University of Technology, China



**Yongbo Peng**

Professor

Shanghai Institute of Disaster Prevention and Relief, Tongji University, China



**Wei Liu**

Research Professor

College of Civil Engineering, Tongji University, China

## Costs and Registration

The training course will be held in a hybrid online and onsite style. The lectures will be given in English.

The participants in China will be encouraged to participate in the course on site in Shanghai (the maximum number of participants on site is **limited to 80**), whereas the overseas participants will participate in the course online.

Due to the sponsorship of Tongji University a reduced attendance fee applies for all participants. For onsite participants, the reduced attendance fee is **3600 RMB Yuan per person for regular participants and 2800 RMB Yuan per person for PhD/graduate students**. Tea breaks between the lectures are provided. For online participants, the reduced attendance fee is **1200 RMB Yuan** for regular participants and **900 RMB Yuan** per person for PhD/graduate students.

Registration form is required via email to Ms. Xueting Zhao (E-mail: [19666072@tongji.edu.cn](mailto:19666072@tongji.edu.cn)) by **25 June 2021**.

## Course Plan

**14:00-21:00, 11 July 2021 (Sunday), Registration**

<b>DAY 1, Monday, 12 July 2021</b>	
<b>Morning</b>	
8:30-8:50	Opening <b>Prof. Michael H. Faber, Prof. J. Li</b>
8:50-9:30	Overview <b>Prof. Michael H. Faber (Jianbing Chen)</b>
10:00-12:00	Uncertainties, probability theory, random variables <b>Prof. Dagang Lu</b>
<b>Afternoon</b>	
14:00-15:45	Properties and distributions of static loads <b>Prof. Jochen Köhler (Dr. Wei Liu)</b>
16:15-18:00	Presented exercises

<b>DAY 2, Tuesday, 13 July 2021</b>	
<b>Morning</b>	
8:30-10:00	Random processes and probabilistic model building (I): Basic theory <b>Prof. Jianbing Chen</b>

10:20-12:00	Random processes and probabilistic model building (II): Earthquakes, wind and waves <b>Prof. Yongbo Peng</b>
<b>Afternoon</b>	
14:00-15:45	Regression analysis <b>Prof. Dagang Lu</b>
16:15-18:00	Presented exercises

<b>DAY 3, Wednesday, 14 July 2021</b>	
<b>Morning</b>	
8:30-10:00	Structural reliability, including definition and time Independent Reliability Methods (FORM), etc. <b>Prof. Yangang Zhao</b>
10:20-12:00	Time Independent Reliability Methods, including SORM, high-order moment methods, etc. <b>Prof. Zhaohui Lu</b>
<b>Afternoon</b>	
14:00-15:45	Time Independent System Reliability Methods <b>Prof. Dagang Lu</b>
16:15-18:00	Presented exercises

<b>DAY 4, Thursday, 15 July 2021</b>	
<b>Morning</b>	
8:30-10:00	Time Dependent System Reliability Methods, stochastic dynamics – I, including first-passage problem <b>Prof. Jianbing Chen</b>
10:20-12:00	Time Dependent System Reliability Methods, stochastic dynamics – II, including probability density evolution method <b>Prof. Yongbo Peng</b>
<b>Afternoon</b>	
14:00-15:45	Applications of reliability to probabilistic design of wind turbines <b>Prof. J. D. Sørensen</b>
16:15-18:00	Presented exercises

<b>DAY 5, Friday, 16 July 2021</b>	
<b>Morning</b>	
8:30-10:00	Global reliability of structures and systems <b>Prof. Jie Li</b>
10:20-12:00	System reliability of infrastructures and networks <b>Prof. Wei Liu</b>
<b>Afternoon</b>	
14:00-15:00	Probabilistic Model Code, Resistance, Loads (including extreme value theory), Safety assessment of existing Structures <b>Prof. Jochen Köhler</b>
15:15-16:45	Codes <b>Prof. Jochen Köhler</b>
17:00-18:00	Robustness analysis of structures <b>Prof. Michael H. Faber</b>



**DAY 6, Saturday, 17 July 2021****Morning**

8:30-10:00	System risks modelling-I <b>Prof. Michael H. Faber</b>
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10:20-12:00	System risks modelling-II <b>Prof. Michael H. Faber</b>
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**Afternoon**

14:00-15:45	Risk analysis and decision making <b>Prof. Michael H. Faber</b>
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16:15-18:00	Presented exercises/case studies/Discussions
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## Map



## Contacts

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