Foreword

Selected papers from the 17th International Topical Meeting on Probabilistic Safety Assessment and Analysis (PSA 2021)

Guest Editor

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Since 1978, the American Nuclear Society (ANS) biennial International Topical Meeting on Probabilistic Safety Assessment and Analysis (PSA) has been a forum for the communication of major probabilistic risk topics associated with the safe operation of nuclear power plants worldwide, including issues, methods, applications, insights, policy, research, and risk-informed regulation.

The theme of PSA 2021 was to look forward to the future of PSA for nuclear power plants and outward at nonnuclear disciplines to address the evolution of risk management for a spectrum of societal issues. About 130 papers were presented in 33 technical sessions in addition to five plenaries, five panels, as well as a first-of-a-kind graduate research lightning round and two workshops. More than 230 participants registered. Amidst the chaos of the COVID-19 pandemic, the conference was first postponed in the hopes that it could be held in person but then finally held online, November 7–12, 2021.

The sessions, panels, and plenaries included diverse topics listed below:

- The licensing modernization project
- Non–light water reactor licensing
- Aging
- Risk analysis methodologies in nonnuclear fields
- Safety and reliability in the automotive industry and electric vehicles
- Risk management and economics
- Dynamic probabilistic risk assessment
- Nonnuclear risk
- Digital instrumentation and control/software reliability
- Risk information management

- Advanced reactors
- Integrated and hybrid energy systems
- The non–light water reactor probabilistic risk assessment standard
- The Level 1, 2, and 3 probabilistic risk assessment standards
- Multi-unit probabilistic risk assessment
- Data analytics and artificial intelligence
- Challenges and external hazards probabilistic risk assessment
- Uncertainty quantification
- External events
- Human reliability analysis
- Extended events
- Physical security
- Advances in Level 2 and Level 3 methodologies.

Tributes and special awards included a short tribute to John Garrick, who passed away in November 2020, and an award to Professor Tunc Aldemir, for his contributions to the area of dynamic probabilistic risk assessment.

The first-ever graduate research lightning round was held at PSA 2021, organized by Katrina Groth. Graduate students from various universities were invited to present their PhD thesis research within brief three-minute poster presentations. Six finalist candidates were selected, and from among them three judges awarded the best lighting round presentations in the two categories of early-stage research and late-stage research. In the early-stage category, the winner was Andres Ruiz-Tagle (University of Maryland), for his work entitled "Causal Reasoning with

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Bayesian Networks for Quantitative Risk Assessment of Engineering Systems." In the late-stage category, the winner was Austin Lewis (University of Maryland), for his presentation titled "Dynamic Bayesian Network Updating Approaches for Enabling Causal Dynamic Probabilistic Risk Assessments."

The general chair for the conference was William Fussel (NASA, retired, USA) who sadly passed away soon after the conference was held.

The technical chair for the conference was Carol Smidts (Ohio State University, USA). The honorary chair for the conference was Richard Denning (Battelle Memorial Institute, retired, USA). The publications chair was Vaibhav Sinha (Ohio State University, USA). Our sponsors chair was John Greenwood, First Energy Corporation, USA.

Our senior advisory board members were as follows:

Tunc Aldemir, Ohio State University, USA

Paul Amico, Jensen Hughes, USA

Steve Arndt, Nuclear Regulatory Commission, USA

Ron Boring, Idaho National Laboratory, USA

Bob Budnitz, Lawrence Berkeley National Laboratory (retired), USA

Matilde D'Arpino, Ohio State University, USA

Enrique Droguett, University of Chile, Chile

Fernando Ferrante, EPRI, USA

Katrina Groth, University of Maryland, USA

Hyun Gook Kang, Rensselaer Polytechnic Institute, USA

Pierre-Etienne Labeau, Université Libre de Bruxelles, Belgium

Ming Li, Nuclear Regulatory Commission, USA

Zahra Mohaghegh, University of Illinois, USA

Poong Hyun Seong, Korea Advanced Institute of Science and Technology (retired), Korea

Abdollah Shafieedazeh, Ohio State University, USA

Curtis Smith, Idaho National Laboratory, USA

Prabhakar Varde, Bhabha Atomic Research Center, India

Jeffrey Woollard, Ohio State University, USA

Joon-Eon Yang, Korea Atomic Energy Research Agency, Korea.

Our local support and logistics team consisted of Yunfei Zhao (Ohio State University, USA), Timothy DeFranco (Ohio State University, USA), and Gulcin Sarici Turkmen (Ohio State University, USA).

We also want to thank the many members of our technical program committee who allowed us to produce a high-quality program.

The five papers in this special issue of *Nuclear Technology* illustrate the diverse aspects of the conference. They are joined by six more papers in the ANS journal *Nuclear Science and Engineering*.

We would like to thank Andy Klein, editor of *Nuclear Technology*; David Strutz, production manager at ANS; and Mary Tong, peer review specialist at ANS, for their efforts to produce this special issue.

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