

# Foreword

Dear Colleagues,

It is our honor to welcome you to Los Angeles, for the fourteenth rendition of the Probabilistic Safety Assessment and Management (PSAM) Conference. We have spent several years coordinating this meeting, and we hope that you take the time to participate in the conference events that we have planned, and that you spend a few days around the conference to enjoy the beautiful UCLA campus and Southern California. We know that many of you have brought your families along and we know they will enjoy the campus and the surrounding area as well.

The planning for PSAM 14 began back in 2014 (during PSAM 12 in Honolulu), when we looked at several locations around the United States, included Arizona, California and Boston, and even considered returning to Honolulu. The PSAM series of conferences began in Southern California, beginning with PSAM 1 held in 1991 in Beverly Hills, not far from the UCLA campus. 1994 saw PSAM 2 in San Diego. Following PSAM 2, the Board of Directors decided to look beyond California and subsequent PSAM conferences were held in Europe, Asia as well as New Orleans, Seattle, Honolulu and Puerto Rico. We decided it was time to return to Southern California. The beautiful new Luskin Conference Center seemed to be a natural choice for the venue, especially since it is right across the street from the recently established B. John Garrick Institute for the Risk Sciences at UCLA.

So after several years of planning, our conference will begin on Sunday, September 16 in the evening with an informal reception event. This will give you the opportunity to get your conference materials before the big opening on Monday, September 17. It will also give you the opportunity to socialize with your colleagues.

Although we will have registration open every day, all day, hopefully we can alleviate any rush handling as many registrations on Sunday.

Starting each day Monday through Thursday of the regular conference, will be a plenary session. We plan on having a variety of speakers from various aspects of the risk sciences. Dr. B. John Garrick, our Honorary Chair will give the opening Plenary and Keynote talk on Monday reflecting on the challenges faced in the risk sciences. Tuesday, Peter Katona, MD, will reflect on bioterrorism. Wednesday, Dr. Ali Mosleh will speak on model risk. Our gala dinner is Wednesday evening; and, Dr Roger McCarthy will, given this is the 30 year anniversary of the accident, reflect on the Piper Alpha tragedy. On Friday Dr. John Casani will reflect on mission assurance of planetary space missions.

On Tuesday we will have the conference luncheon. Lastly, we will close our conference on Friday, September 21, at noon with our customary ice cream.

On behalf of the International Association for Probabilistic Safety Assessment and Management Board of Directors, we wish you all an enjoyable learning experience at the conference, a memorable stay in the Los Angeles area, and a safe journey home.

Dr. Enrique Lopez Droguett  
Technical Program Chair

Dr. David Johnson  
General Chair

# Acknowledgement

The task of organizing any successful large meeting, conference, or event, requires the dedicated effort of many people. I would like to recognize three individuals specifically without whom our conference would not have been successful: Ms. Hanna Shapira, Dr. Enrique Lopez Droguett and Dr. Mihai Diaconeasa.

While many people have helped review this program, special recognition is given to Dr. Curtis Smith for his careful, detailed and thoughtful comments as well as his guidance for the conference.



Sponsoring organizations are also key to a successful conference. Once again, Lloyd's Register has stepped forward to be our major sponsor. Their support over many conferences is very much appreciated. The B John Garrick Institute for the Risk Sciences is also a key sponsor and an important source of person-power assuring smoothly running technical sessions. The support given by EPRI, The University of Maryland and ANS is also very much appreciated.

On a personal note, I would like to thank my mentor of more than 35 years, Dr. B John Garrick to agreeing to be our Honorary Chair and to give the keynote talk.

I also thank each of you participating in PSAM 14. The PSAM series of conferences are perhaps unique in that there is no 'sponsoring society' involved. While the conferences are overseen by a Board of volunteers, each of you attending a PSAM conference are its very heart. Without your participation, there would be no PSAM.

Thank you.

David Johnson  
PSAM14 General Chair

## Welcoming Remarks

It is a pleasure to welcome the conferees of PSAM 14 to the UCLA campus. PSAM has become a major player in advancing the risk and safety sciences for the good of the people and the environment. It is fitting that PSAM 14 be located where it had its birth at a time when UCLA has launched an institution totally dedicated to the risk sciences. We hope you not only enjoy the conference, but all the cultural and entertainment this thriving community has to offer. We further hope that the spinoff of the conference will be new found advances in managing risks and the fueling of new collaborations for achieving a safer world.

B. John Garrick

Honorary Chairman, PSAM 14





# The B. John Garrick Institute for the Risk Sciences

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## UCLA ENGINEERING

THE UCLA B. JOHN GARRICK INSTITUTE FOR THE RISK SCIENCES (GIRS) was established with a generous gift by Amelia and B. John Garrick in 2014. GIRS is dedicated to providing methods and technology for assessing and managing risks to society for the purpose of saving lives, protecting the environment, and the overall betterment of society. GIRS is the umbrella organization for the risk, reliability, and resilience research and related educational activities at UCLA. The Institute is home to more than 40 Core, Adjunct, and Affiliate Faculty from various schools and departments of UCLA, actively conducting theoretical and applied research on (a) quantifying the risk of the most serious threats to society to better enable their prevention, reduce their likelihood of occurrence, or limit their consequences, and (b) improving system performance with respect to the capability to perform its intended function while assuring the health and safety of the public and protection of the environment. Disciplines considered within the scope of the Institute include quantitative risk assessment and management, reliability and resilience engineering, system performance assessment, and the social sciences. Domain-specific Research Center within GIRS include Center for Reliability Engineering, Center for SMART Health, and Center for Natural Hazards Risk and Resilience Research. The Institute activities include:

- provide environment for collaboration on research projects with federal agencies, industry partners, and researchers at UCLA and other U.S. and international universities.
- offer resource for independent technical review and assessment of the performance of systems with respect to such performance indicators as risk, reliability, and resilience
- provide repository of risk sciences information
- promote, distribute, and when possible commercialize methods and technologies developed at the Institute
- organize or co-sponsor workshops and conferences on risk, reliability, resilience, and safety engineering,
- publish reports dedicated to fundamental research on theoretical foundations and applications of risk management,
- conduct distinguished lecture series in risk, reliability, and safety, inviting prominent policy makers, researchers, and industry leaders,
- offer awards recognizing excellence in risk research and offer student fellowship programs through industrial affiliates and government agencies