



Risk and Reliability



UCLA Engineering launches the B. John Garrick Institute for the Risk Sciences to improve resilience and prevent failures of complex natural and manmade systems and processes.

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UCLA ENGINEERING

B. John Garrick Institute for the Risk Sciences

By Bill Kisliuk

From tiny medical devices to systems as vast and complex as nuclear power plants, engineers are called upon to develop technologies that maximize efficiency and reliability while minimizing the potential of harm to people, property or the planet.

Creating a premiere center for the field of risk and reliability engineering, in the fall of 2014 the UCLA Henry Samueli School of Engineering and Applied Science launched the B. John Garrick Institute for the Risk Sciences.

The Garrick Institute aims to bring together top researchers from across disciplines and university campuses to address risk and reliability engineering in its many permutations: To increase safety for patients in healthcare settings; prevent, manage and prepare for challenges stemming from industrial failures and natural disasters; and model the reliability of complex systems ranging from next-generation automobiles to cybersecurity solutions.

“The risk sciences require knowledge in specialized fields – such as civil engineering, manufacturing or dealing with hazardous materials – as well as disciplines rooted in logic, plausible reasoning and probabilistic inference,” said Ali Mosleh, MS '78, PhD '81, the director of the Garrick Institute. “Our work in reliability engineering focuses on the enormous complexities posed by



The Garrick Institute will collaborate with researchers from the David Geffen School of Medicine and several other UCLA departments, as well as national laboratories and research centers.

systems of interacting hardware, software and the human element.”

UCLA's Evalyn Knight Chair in Engineering and a distinguished professor of materials science and engineering, mechanical and aerospace engineering, and electrical engineering, Mosleh has a 30-year history in the risk sciences.

He has worked with organizations ranging from NASA and the Federal Aviation Administration to large utilities and manufacturers. In 2010 he was elected to the National Academy of Engineers, the highest honor for engineers in the United States.

The institute's founder and senior advisor is B. John Garrick MS '62, PhD '68. Garrick is a pioneer in the risk sciences who has served on

GOALS OF THE GARRICK INSTITUTE

- Conduct seminal research in the risk sciences
- Collaborate on research projects with federal agencies, industry partners and researchers at UCLA and other U.S. and international universities
- Be a resource for independent technical review and assessment of the performance of complex systems
- Provide a world-class repository of risk sciences information
- Promote, distribute and when possible commercialize methods and technologies developed by institute researchers
- Organize and co-sponsor workshops and conferences, and publish fundamental research on theoretical foundations and applications of risk management
- Develop student fellowship programs through industrial affiliates and government agencies
- Offer awards, including the institute's highest prize in the name of the founder, recognizing excellence in risk research
- Offer a master's degree and graduate certificate in risk analysis and reliability engineering
- Provide continuing education classes and training for working professionals

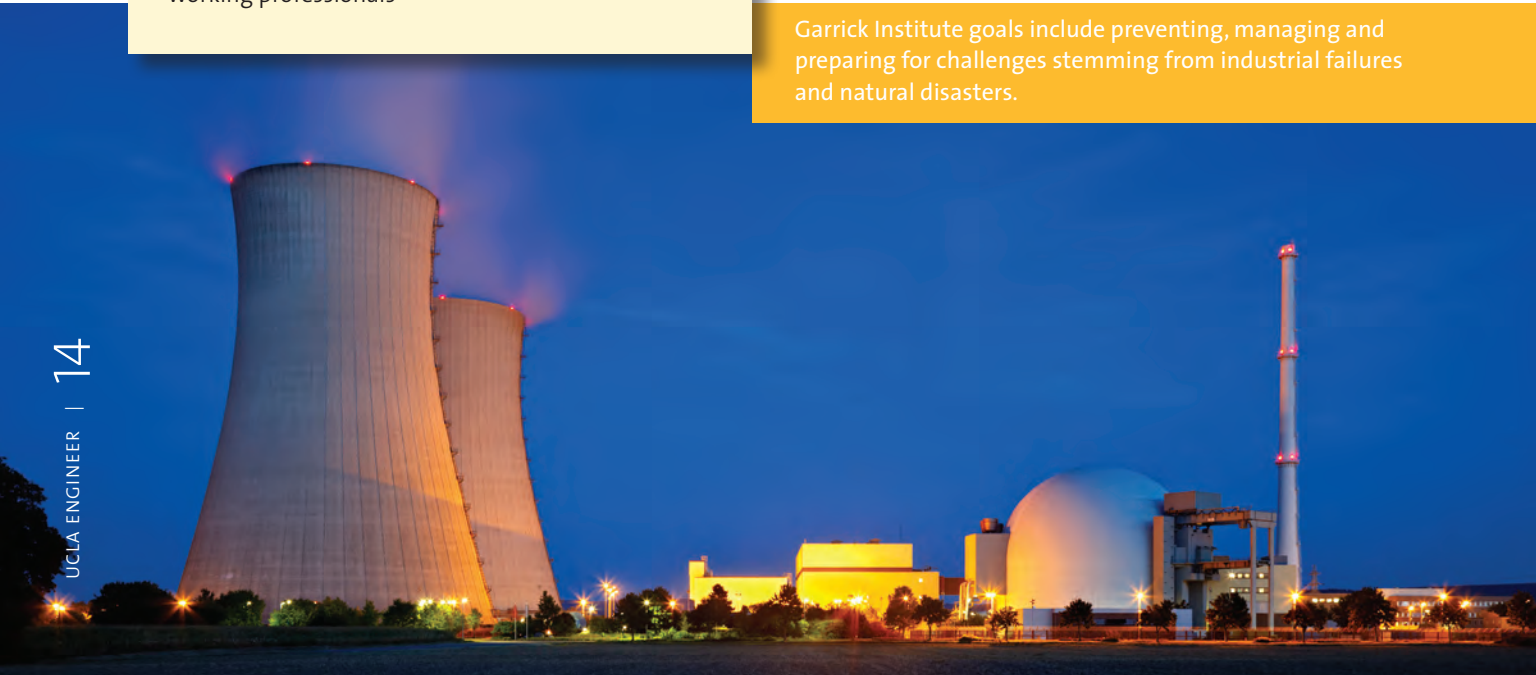
and chaired committees of the National Academies addressing topics including terrorism, space exploration, chemical weapons, marine systems and automobile safety. In 1993 Garrick was elected to the National Academy of Engineering “for making quantitative risk analysis an applied science and a fundamental part of engineering design.”

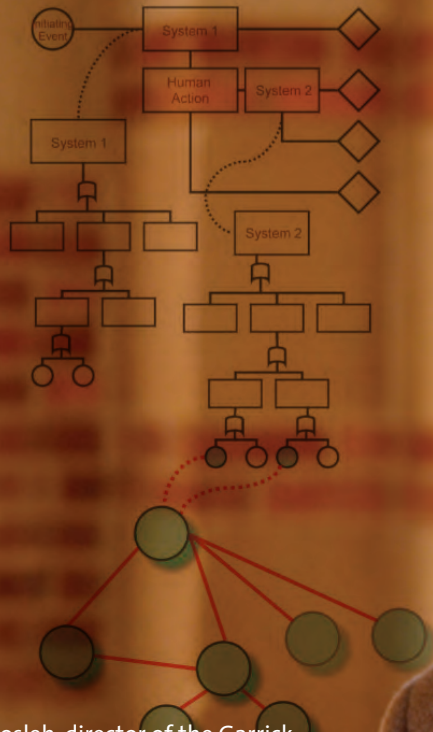
In 2004, both Mosleh and Garrick were appointed by President George W. Bush to serve on the U.S. Nuclear Waste Technical Review Board, Garrick as chairman. They continued to serve until 2012 under President Obama.

“The complexity of risks to society and the environment has increased dramatically in the 20th and 21st centuries,” Garrick said. “We must meet the challenge of managing these threats with new thinking, methods, tools and applications.”

Still in its early stages, the Garrick Institute has created a Senior Fellows program to attract veteran researchers from academia and industry, and is engaging in discussions with a variety of manufacturers and agencies developing new technologies. More than 15 faculty from the school of engineering

Garrick Institute goals include preventing, managing and preparing for challenges stemming from industrial failures and natural disasters.





Ali Mosleh, director of the Garrick Institute, shown with the patented hybrid causal logic (HCL) methodology he developed for risk analysis of socio-technical systems.



are now formally affiliated with the institute, and the list is expected to grow in the next few months to include researchers from the David Geffen School of Medicine and other UCLA schools and departments including environmental science, social sciences, psychology, economics and public policy. The institute is also in discussion with several national laboratories and prominent centers in other countries to establish collaborative research programs.

“Risk and reliability engineering have had a profound impact on industry and society,” Mosleh said. “Every day, we become more connected, and

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systems become more complex, than ever before. With this institute, UCLA is perfectly positioned to tap its rich cross-disciplinary resources to lead the way to more safety, more security and greater achievements in this field.” ■