

NUS LRFI CONFERENCE ON RISK



AN
INAUGURAL
EVENT

SINGAPORE

27 July 2017

9am-5pm

NUS University Hall,

Auditorium, Level 2, Lee Kong Chian Wing,
21 Lower Kent Ridge Road, Singapore 119077



Lloyd's Register
Foundation



NUS
National University
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Inaugural Conference of the Lloyd's Register Foundation Institute for the Public Understanding of Risk (LRFI)

27 July 2017

NUS University Hall, Lee Kong Chian Wing, Level 2, Auditorium,
21 Lower Kent Ridge Road, Singapore 119077

Time	Event
8:30 – 9:00	Registration
9:00 – 9:15	<p>Welcome Address and Launch of Foresight Review on the Public Understanding of Risk</p> <ul style="list-style-type: none"> • Prof PHOON Kok Kwang – Interim Director, LRFI, NUS; Co-Chair, Foresight Review • Prof Richard CLEGG – Foundation Chief Executive, Lloyd's Register Foundation (LRF) • Prof Elke U. WEBER – Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs, Princeton University; Co-Chair, Foresight Review <p>Conference participants will be the first in the world to receive a copy of the new <i>Lloyd's Register Foundation Foresight Review on the Public Understanding of Risk</i>, produced in collaboration with NUS. The report describes how public perceptions of everyday risks impact decisions, and identifies opportunities for better communication of risk to society.</p>
9:15 – 10:25	<p>Session</p> <ul style="list-style-type: none"> • <u>Chair</u>: Prof Richard CLEGG – Foundation Chief Executive, LRF
9:15 – 9:50	<p>Understanding Risk: What Have We Learned and Where Should We Go From Here?</p> <ul style="list-style-type: none"> • Prof Paul SLOVIC – Professor of Psychology, University of Oregon, and President of Decision Research
9:50 – 10:25	<p>NIED Integrated Research on Risk Communication for Disaster Risk Reduction and Resilience</p> <ul style="list-style-type: none"> • Prof Haruo HAYASHI – President, National Research Institute for Earth Science and Disaster Resilience (NIED)
10:25 – 10:45	Tea
10:45 – 12:30	<p>Session</p> <ul style="list-style-type: none"> • <u>Chair</u>: Prof Richard EBSTEIN – Professor, Department of Psychology, NUS
10:45 – 11:20	<p>The Power and Complexity Of Perceived Risk</p> <ul style="list-style-type: none"> • Prof Elke U. WEBER – Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs, Princeton University
11:20 – 11:55	<p>Food Safety Concerns in Mainland China: Trust, Knowledge and Risk Perception</p> <ul style="list-style-type: none"> • Prof XIE Xiaofei – School of Psychological and Cognitive Sciences, Peking University

Time	Event
11:55 – 12:30	<p>It Is Not Easy Being Green: How Risk, Time Delay and Uncertainty Make Consumers Environmental Decisions Difficult</p> <ul style="list-style-type: none"> • Prof Eric JOHNSON – Norman Eig Chair of Business, and Director, Center for Decision Sciences, Columbia University
12:30 – 13:30	Lunch
13:30 – 14:30	<p>Panel Discussion – How Do We Perceive Risk</p> <ul style="list-style-type: none"> • <u>Moderator</u>: Prof Richard CLEGG – Foundation Chief Executive, LRF <p><u>Panellists</u>:</p> <ul style="list-style-type: none"> • Prof Anil GABA – Professor of Decision Sciences, The Orpar Chaired Professor of Risk Management and Academic Director, Center for Decision Making and Risk Analysis, INSEAD • Prof Haruo HAYASHI – President, NIED • Prof PAN Tso-Chien – Executive Director, Institute of Catastrophe Risk Management, Nanyang Technological University • Mr Greg UNSWORTH – Digital Business & Risk Assurance Leader, PwC Singapore
14:30 – 15:00	<p>Session</p> <ul style="list-style-type: none"> • <u>Chair</u>: Prof PHOON Kok Kwang – Interim Director, LRFI, NUS <p>From Big to Smart and on to Actionable Data — A New Credit Risk Analytics Paradigm</p> <ul style="list-style-type: none"> • Prof DUAN Jin-Chuan – NUS Risk Management Institute, and Cycle & Carriage Professor of Finance, NUS Business School, NUS
15:00 – 15:20	Tea
15:20 – 16:55	<p>Session</p> <ul style="list-style-type: none"> • <u>Chair</u>: Prof Robert WASSON – Lee Kuan Yew School of Public Policy, NUS
15:20 – 15:55	<p>Risk Communication as a Strategic Activity</p> <ul style="list-style-type: none"> • Prof Baruch FISCHHOFF – Howard Heinz University Professor, Department of Engineering and Public Policy, Institute for Politics and Strategy, Carnegie Mellon University
15:55 – 16:25	<p>Communicating Diverse Risks and Benefits in Differentiated Contexts</p> <ul style="list-style-type: none"> • Dr Makiko MATSUO – Project Assistant Professor, Graduate School of Public Policy, The University of Tokyo
16:25 – 16:55	<p>Managing Complex Interconnected Risks: Diverse Risk Perceptions and Governance</p> <ul style="list-style-type: none"> • Prof HENG Yee Kuang – Graduate School of Public Policy, The University of Tokyo
16:55 – 17:00	<p>Closing Remarks</p> <ul style="list-style-type: none"> • Prof HO Teck Hua – Deputy President (Research and Technology), NUS

Welcome Message

Dear distinguished guests, colleagues and friends,

It gives us great pleasure to welcome you to the inaugural conference of the Lloyd's Register Foundation Institute for the Public Understanding of Risk (LRFI). While our newly-established Institute for the Public Understanding of Risk is in its infancy, it's taking some important first steps. This conference is one of them. The publication of the *Foresight Review on the Public Understanding of Risk* that the institute is also launching at the conference, is another one. On this journey, the institute aims to become an open, trusted, independent and authoritative voice on the public understanding of risk. To achieve this, it has to build a coalition of support from academia, industry, governments, media, as well as the general public. Hence, the importance of this conference.

We have to make decisions in the face of uncertainties in our daily lives. Is there health risk in a product? Is it safe to travel? More information does not necessarily lead to better decisions, unless we understand how to discern between facts, fiction, and fears, and how to guard against biases in making inappropriate decisions even when the facts are relatively well understood. This conference brings together some of the foremost experts to talk about how we think and feel about risks and how to formulate communication and policy strategies to build safer and more resilient communities. This conference is arguably the first of its kind in Singapore to bring experts and lay people together to talk about how we can strengthen consensus and arrive at better decisions, by promoting an evidence-based approach and an attitude that experts and the public have something valid to contribute as far as risks are concerned.

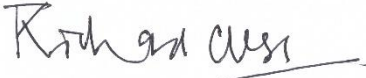
Some say we are entering an era that is more volatile and more uncertain. New technologies bring new risks. Deep transformations are underway that do not merely redefine how we do things, but who we are. We invite all concerned parties to join in this conversation and share your views on how we can reshape our collective future into something that our children will look forward to.

Thank you for joining us, once again, and may you have a fruitful day ahead.

With best wishes,



Phoon Kok Kwang
Interim Director



Richard Clegg
Foundation Chief Executive
Lloyd's Register Foundation

Welcome Address



Prof PHOON Kok Kwang

Interim Director, Lloyd's Register Foundation Institute for the Public Understanding of Risk
Vice Provost (Academic Personnel), National University of Singapore

Phoon Kok Kwang is interim director of the Lloyd's Register Foundation Institute for the Public Understanding of Risk. He is also vice provost (academic personnel) and a distinguished professor at the National University of Singapore.

A graduate of the National University of Singapore and Cornell University, Prof Phoon is a geotechnical engineer and has been a faculty member in the NUS Department of Civil and Environmental Engineering since 1995. He was the head of the Department of Civil and Environmental Engineering from May 2013 to August 2015.

Prof Phoon's expertise lies in risk and reliability in geotechnical engineering. He is a recipient of numerous awards, including the Norman Medal (2005) – the highest honour granted by the American Society of Civil Engineers (ASCE) – the NUS Outstanding Researcher Award (2010), the Annual Teaching Excellence Award (ATEA, 2011 and 2012), as well as the John Booker Medal (2014) from the International Association of Computer Methods and Advances in Geomechanics (IACMAG).

Prof Phoon is the current Chair of TC304 - Engineering Practice of Risk Assessment and Management, of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE). He was the past chair of the ASCE Geo-Institute Technical Committee on Risk Assessment and Management (2003-2009). He is the first person outside the USA to chair both committees, which are the most influential committees in his field. He has served as the scientific advisor to the International Centre for Geohazards (2004-2013), as a board member of the Civil Engineering Risk and Reliability Association (2003-2011), and as president of the Geotechnical Society of Singapore (2010-2011). He is a current board member of the International Association for Computer Methods and Advances in Geomechanics, and executive board member of the International Association for Structural Safety and Reliability. He was elected a fellow of ASCE in 2008, a fellow of the Institution of Engineers Singapore (IES) in 2009, and a fellow of the Academy of Engineering Singapore in 2012.

At the university level, Prof Phoon has served in various capacities, including as a member of the University Promotion and Tenure Committee (UPTC), the NUS Senate Delegacy, the Research Excellence Award Committee (REAC), the University Research Benchmarking Consultative Committee (RCCC), the University Awards Selection Committee, and as chair of the Task Force on Continuing and Professional Education.

Welcome Address & Panel Discussion



Prof Richard CLEGG

Foundation Chief Executive, Lloyd's Register Foundation

Richard Clegg is the foundation chief executive of the Lloyd's Register Foundation, a global charity with the mission to enhance the safety of life and property and advance public education. The Foundation is a major supporter of science and engineering-related research, skills and education, public outreach, and accelerating technology to application.

Prior to heading the Foundation, Prof Clegg had a strong scientific background in industry, government, and academia principally in the civil and defence nuclear sectors. He was the founding director of the Dalton Nuclear Institute and also research dean of engineering and physical sciences at the University of Manchester.

He sits on a number of UK government and industry advisory committees, is a trustee of the Science Museum Group in London, a fellow of the Royal Academy of Engineering and a fellow of the Royal Society of Chemistry.

Session Chair



Prof Richard EBSTEIN

Department of Psychology, National University of Singapore

Richard Ebstein is professor in the Psychology Department at the National University of Singapore and professor emeritus in the Psychology Department at the Hebrew University. Prof Ebstein received his BS from Union College and his MS and PhD from Yale University.

In Singapore, Prof Ebstein along with Chew Soo Hong, is heading a group of researchers including economists, psychologists, neuroscientists and molecular geneticists investigating core issues in the nascent field of neuroeconomics.

Prof Ebstein has made substantial contributions to the molecular genetics of human personality and is a pioneer in applying neurogenetic strategies towards understanding individual and social decision making. His research revolves around human behaviour genetics, with the overarching goal of providing molecular insights into the role of genes as a partial contributor to all facets of human behaviour. His work is highly interdisciplinary and combines personality, social, cognitive, and neuropsychology with techniques of molecular genetics. Major research areas include neuroeconomics, the genetics of social behaviour and normal personality, autism, ADHD, eating disorders, and substance abuse.

He has published over 300 peer reviewed articles.

Understanding Risk: What Have We Learned and Where Should We Go From Here”



Prof Paul SLOVIC

Professor of Psychology, University of Oregon and
President of Decision Research

Psychological research has aimed to assist risk management by (i) providing a basis for understanding and anticipating public responses to hazards and (ii) improving the communication of risk information among lay people, technical experts, and decision-makers. Much of this research has been conducted in the United States and Europe and has addressed the following questions: How do people think about risk? What psychological, social, cultural, and political factors determine the perception of risk and the acceptance of risk? What role do emotion and reason play in risk perception? What are some of the social, economic and political implications of risk perceptions in today's global world? After reviewing this work, I shall point to some future research directions that might be important to pursue in Asia.

Biography

Paul Slovic, a founder and president of Decision Research, and professor of psychology at the University of Oregon, studies human judgment, decision making, and risk analysis. He and his colleagues worldwide have developed methods to describe risk perceptions and measure their impacts on individuals, industry, and society. He publishes extensively and serves as a consultant to industry and government.

Prof Slovic is a past president of the Society for Risk Analysis and in 1991 received its Distinguished Contribution Award. In 1993 he received the Distinguished Scientific Contribution Award from the American Psychological Association. In 1995 he received the Outstanding Contribution to Science Award from the Oregon Academy of Science. He has received honorary doctorates from the Stockholm School of Economics (1996) and the University of East Anglia (2005). Prof Slovic was elected to the American Academy of Arts and Sciences in 2015 and the National Academy of Sciences in 2016.

NIED Integrated Research on Risk Communication for Disaster Risk Reduction and Resilience



Prof Haruo HAYASHI

President, National Research Institute for Earth Science and Disaster Resilience

Disaster risk reduction and resilience is the basis for sustainable development. However, damage and losses due to disasters are increasing in both developed and developing countries. To make our societies more disaster resilient, we need to maximize the use of existing knowledge and create new types of science and technology that serve broad and collective societal needs. Research on disaster risk reduction and resilience should be both interdisciplinary and transdisciplinary in nature. The 150 researchers at NIED are aiming at integrating their research outcomes in terms of information products based on a two-way risk communication framework. In this presentation, some of these achievements will be introduced.

Biography

Haruo Hayashi has been president of the National Research Institute for Earth Science and Disaster Resilience since 2015. He is also professor emeritus at the Disaster Prevention Research Institute, Kyoto University, where he has taught since 1994. He received both his bachelor's and master's degrees from Waseda University, and his Ph.D. from the University of California, Los Angeles in the field of social psychology.

The general focus of Prof Hayashi's work is on societal and human reactions to disasters, risk communication and education, information systems for disaster management, standardisation of emergency operations, and multi-hazard risk assessment. He is co-author of "Japan's Megadisaster Challenges in the Modern Era" with Professor William J. Simbieda, in F. Baldwin and A. Allison (editors), *Japan: The Precarious Future*, published by New York University Press in 2015.

The Power and Complexity of Perceived Risk



Prof Elke U. WEBER

Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs, Princeton University

Contrary to normative theories of risky choice in economics, finance, and behavioural ecology, risk sensitivity and hence the perception of risk has been shown not to correspond to the variance of possible outcomes. Instead perceived risk is far more complex. Variation is perceived in a relative rather than absolute fashion, making the coefficient of variation a better metric than the variance or standard deviation of outcomes. The perception and reaction to small probability outcomes depends on how information about possible outcomes is acquired, by sequential personal experience or in the form of a statistical summary. Familiarity with choice options also plays a role, with familiarity breeding not only liking but also reduced perceptions of risk. Risk is often more of a feeling than the result of an analysis, with non-consequential psychological risk dimensions playing an important role. In these and other ways, perceptions of risk are subjective rather than objective. Awareness of the complexity of this construct is rewarded by the fact that an accurate prediction of how a given risk is perceived by a given individual, group, or culture typically allows one to predict that person's, group's, or culture's decisions in the face of that risk, as risky choice is often more a function of the perception of risk than risk attitude. Furthering the public understanding of risk involves a two-way street that acknowledges the full range of factors that shape perceptions and reactions towards different risks while aligning and reconciling the perceptions of different groups and stakeholders.

Biography

Elke U. Weber is a professor of psychology and public affairs at Princeton University where she holds the Gerhard R. Andlinger Professorship in Energy & the Environment. She is co-director of Columbia University's Earth Institute's Center for Research on Environmental Decisions. Prof Weber received a BA in psychology from York University in 1980 and a PhD in psychology from Harvard University in 1984. She began her professional career at the University of Illinois at Urbana-Champaign in 1985. From 1988 to 1995 she was assistant and then associate professor of behavioural science at the University of Chicago's Graduate School of Business. In 1995 she joined Ohio State University as a professor in the departments of psychology and management and human resources. In 1999, Prof Weber joined Columbia University as professor of management and professor of psychology, and where she was a Jerome A. Chazen Professor of International Business until 2016. In 2016, she joined the faculty at Princeton University as a professor of psychology and public policy.

Prof Weber's specialty is judgment and decision-making under risk and uncertainty. Her research has investigated psychologically appropriate ways to measure and model individual and cultural differences in risk taking, specifically in risky financial situations and environmental decision making and policy. She also does research related to query theory and the role that memory processes play in preference construction. More recently, she is known for her contributions to research on choice architecture and how to apply decision research to public policy.

Prof Weber has served as president of the Society for Neuroeconomics, the Society for Mathematical Psychology, and the Society for Judgment and Decision Making.

Food Safety Concerns in Mainland China: Trust, Knowledge and Risk Perception



Prof XIE Xiaofei

School of Psychological and Cognitive Sciences, Peking University

Food and food safety are critically important to all people. Food safety has become more and more of a concern of the Chinese population, as well as the Chinese government. The government has made several efforts to ensure food safety in China, such as promoting food technology, improving the legal system, and providing more information on food safety. These actions have ameliorated food safety in China over the past decade, but the public there still perceives food safety to be at a very low level. What is the cause of this gap between the objective condition of improved food safety and the subjective perception of low food safety?

This talk pays close attention to the psychological rules underpinning public perceptions, in order to propose effective risk communication regarding food safety. Two approaches of attitude formation (top-down approach and bottom-up approach) form the basis of the talk. Using four research projects, we investigate: (1) how SVS (salient value similarity) influences trust building; (2) the effects of having (a) basic food safety knowledge and (b) food additives knowledge, on attitudes to food additives; and (3) the impact of knowledge types (i.e. risk knowledge and benefit knowledge) on attitudes to genetically modified food. Finally, we turn to effective knowledge dissemination, probing into how it exerts an influence on knowledge, attitudes and trust in food additives.

Biography

Xie Xiaofei is professor of psychology at the School of Psychological and Cognitive Sciences at Peking University. She heads the Risk Perception and Decision-Making Laboratory at Peking University, which is committed to risk perception, risk communication, decision-making and other related areas of research.

Prof Xie graduated with a PhD in psychology from the Chinese Academy of Sciences. She is currently working on a key project for the National Nature-Science Foundation of China entitled "The physical-mental interactive function model in crisis: From individuals to groups". The project investigates several topics, such as prosocial behaviour, justice, and physical and social pain, that are essential in crisis and risk communication. One of the main aims of this project is to explore the traits and context factors that promote altruistic behaviours, as well as the positive outcomes of altruistic behaviours. In the decision-making area, she leads the project named "Social comparisons in the decision-making process", which seeks to understand how social comparison influences the setting of reference points, risky decision making, satisfaction, and self-evaluations. In addition, she is also interested in self-other differences in decision making, which are not only motivated by economic factors, but are also caused by psychological factors such as construal level, queries, and regulatory focus.

It Is Not Easy Being Green: How Risk, Time Delay and Uncertainty Make Consumers Environmental Decisions Difficult



Prof Eric JOHNSON

Norman Eig Chair of Business, and Director, Center for Decision Sciences, Columbia University

Consumers face a number of barriers in making choices that will promote sustainability. In this talk, I will review some of the challenges and discuss interventions that can, and have, increased the frequency of environmentally sustainable choices. The barriers include present oriented intertemporal choices, mental accounting and reference dependent risk preferences. These can be alleviated by presenting choices differently or by adopting different choice architectures. I will review research both by myself and others, in the lab and in the field, that show that these interventions can result in more choices that promote the environment and produce better outcomes for consumers, policy makers and the world at large.

Biography

Eric Johnson is a faculty member at the Columbia Business School at Columbia University where he is the inaugural holder of the Norman Eig Chair of Business, and director of the Center for Decision Sciences. His research examines the interface between behavioural decision research, economics and the decisions made by consumers, managers, and their implications for public policy, markets and marketing. Among other topics, Prof Johnson has explored how the way options are presented to decision makers affects their choices in areas such as organ donation, the choice of environmentally friendly products, and investments. At Columbia, he has developed courses in behavioural economics and decision making, and the psychology and economics of consumer finance. He is now developing a course “Becoming Better Choice Architects”, and has won the Dean’s Award for Innovation in the Curriculum.

Prof Johnson’s research and comments have appeared in *The New York Times*, *The Wall Street Journal*, *Money*, *Discover*, *Business Week* and *The Financial Times*, and on The CBS Evening News and National Public Radio. His publications have appeared in *Science*, *Psychological Review*, *Nature Neuroscience*, *Harvard Business Review*, *The Journal of Economic Theory*, and many other consumer, economic, marketing and psychology journals. He has co-authored two books: *Decision Research: A Field Guide*, published by Sage Publications, and *The Adaptive Decision-Maker*, published by Cambridge University Press, and is currently working on a book on choice architecture.

After graduation from Rutgers University, he received his MS and PhD in psychology from Carnegie Mellon University, and was a National Science Foundation postdoctoral fellow at Stanford University. He previously taught at Carnegie Mellon, was a visiting professor at the Sloan School at MIT, was the inaugural holder of the David W. Hauck Chair in Marketing, and was a professor of operations and information management and psychology at the University of Pennsylvania. According to the Institute for Scientific Information, he is one of the most highly cited scholars in business and economics. He has also been president of the Society for Neuroeconomics and the Society for Judgement and Decision-Making. He is currently a visiting scholar at the Consumer Financial Protection Bureau.

Panel Discussion



Prof Anil GABA

Professor of Decision Sciences, The Orpar Chaired Professor of Risk Management and Academic Director, Center for Decision Making and Risk Analysis, INSEAD

Anil Gaba received his PhD in decision sciences at Duke University in the United States. He is currently the Orpar Chaired Professor of Risk Management and professor of decision sciences at INSEAD. He is also the academic director of Centre on Decision Making and Risk Analysis at INSEAD. He was dean of the faculty at INSEAD in 2006-2009, and dean of the faculty and research at the INSEAD Asia campus in 2002-2006.

His research is in the areas of assessment and use of subjective information, and analysis of decisions under risk and uncertainty. His research has appeared in several academic journals such as *Management Science*, *Operations Research*, *Marketing Science*, and *Journal of Risk and Uncertainty*. He is a co-author (with S. Makridakis and R. Hogarth) of a book, *Dance with Chance: Making Luck Work For You*.

He teaches courses on uncertainty, data, and judgment (MBA), probability and statistics (PhD), and Bayesian analysis (PhD). In addition, he teaches modules on judgments and decision making and risk management in several executive development programmes all over the world including in Europe, the United States, China, Singapore, India, and the Middle East. He has won the Outstanding Teacher Award for his INSEAD MBA core course, Uncertainty, Data, and Judgment, ten times.

He is a regular consultant and keynote speaker at various multinationals in areas of judgment and decision making and risk management.

Panel Discussion



Prof PAN Tso-Chien

Executive Director, Institute of Catastrophe Risk Management, Nanyang Technological University

Professor Pan Tso-Chien received his PhD and MS degrees (in structural engineering and structural mechanics) from the University of California at Berkeley in the USA, and his BS degree from the National Cheng Kung University in Taiwan. He joined the faculty of Nanyang Technological University (NTU) in Singapore in 1985. Prof Pan served for 5 years as NTU's dean of the College of Engineering (CoE), to 30 June 2011. With 16,000 students, NTU's CoE was one of the largest engineering colleges in the world. Prof Pan has provided critical leadership in the transformation of NTU's CoE to a world-class college. He is currently the founding executive director of the Institute of Catastrophe Risk Management (ICRM) at NTU.

Prof Pan specializes in the analysis and design of structures against dynamic loading. Over the years, Professor Pan has carried out many research projects in the area of dynamic structural response to shock and blast loading, as well as earthquake engineering. Prof Pan has made useful contributions to both the national and international research communities. He is now serving the international engineering profession as director of the World Seismic Safety Initiative (WSSI), the International Association for Earthquake Engineering (IAEE), and was director of the executive committee of the IAEE from 2004 to 2008. Professor Pan is a fellow of the Academy of Engineering, Singapore, the founding president of the Earthquake Society (Singapore), a fellow of the Institution of Engineers, Singapore, and an associate editor of the *Journal of Structural Engineering* of the American Society of Civil Engineers. He is also a fellow of the ASEAN Academy of Engineering and Technology.

Panel Discussion



Mr Greg UNSWORTH

Digital Business & Risk Assurance Leader, PwC Singapore

Greg Unsworth is PwC's risk assurance and digital business leader based in Singapore and has previously served as the technology sector leader for the Asia Pacific region. He serves on PwC's Singapore Leadership Team and has significant experience auditing and advising clients across industry sectors.

Mr Unsworth has broad overseas and regional experience having been based in the company's London, Sydney and Tokyo offices. Whilst in Tokyo, he was responsible for the coordination and delivery of services for IBM throughout the Asia Pacific region as well as advising a number of leading Japanese and multi-national telcos on a range of key business issues.

In his risk assurance role, he oversees a team of 20 partners and 380 professional staff who help PwC's clients manage their business risks. This includes:

- Governance, risk and controls including ERM, internal audit and control advisory services
- Risk, regulation and compliance solutions - helping clients manage regulatory risk and compliance with industry regulations, and
- Digital trust - assisting clients to manage technology risk in all its forms, including cyber risk, data privacy and governance, and manage IT compliance services.

Mr Unsworth is a member of a number of PwC's global advisory and editorial committees involved in the development of the firm's industry thought leadership and he regularly works with global and regional industry networks and specialists. He also recently served on the technology and R&D Working Committee for Singapore's Infocomm Media 2025 Masterplan.

From Big to Smart and on to Actionable Data — A New Credit Risk Analytics Paradigm



Prof DUAN Jin-Chuan

NUS Risk Management Institute, and Cycle & Carriage Professor of Finance, NUS Business School, NUS

To unleash the power of big data, it is better to first transform big data into smart data so that with further simple processing, actionable data can emerge to assist decision making. The Credit Research Initiative (CRI) was launched at the National University of Singapore in 2009 as a concrete “public good” response to the need for credit rating reform after the 2008 global financial crisis. The CRI research/service infrastructure showcases a smart data paradigm in action. The smart data used are the daily updated probabilities of default (PDs) and actuarial spreads (ASes) -- a CDS-like credit risk measure -- on all exchange-traded firms globally, including around 35,000 currently active companies in 120 economies, and over 20 years of historical time series data on more than 60,000 companies, inclusive of companies that are inactive due to bankruptcies, M&As and other reasons. These freely accessible PDs and ASes are products of scientific research conducted by CRI researchers with contributions from both global researchers and practitioners. The development and maintenance of the live CRI platform is staffed by a team of over forty dedicated members.

The CRI Smart Data platform has created a new possibility for scientific research; for example, researchers can develop and/or test their credit solutions/ideas on live data which typically presents a different set of challenges. Through real-world applications of its deep credit analytics, CRI has also demonstrated new possibilities of creating actionable data via smart data in fintech. As an example, CRI has, in collaboration with the International Monetary Fund, developed a bottom-up default analysis (BuDA) toolkit currently used by the IMF staff to translate live CRI-PDs under presumed economic scenarios into impacts on the credit risk profile of a target group of financial institutions or nonfinancial corporates (i.e., stress testing) in a timely fashion.

Biography

Duan Jin-Chuan is the Cycle & Carriage Professor of Finance in the NUS Business School. He served as director of the NUS Risk Management Institute from July 2007 to June 2014. During that tenure, he pioneered the “public good” Credit Research Initiative, started in March 2009; he continues to lead the CRI team, which consists of more than forty people. In 2017, Duan co-founded a fintech start-up, CriAT, specializing in deep credit analytics. In 2008, Prof Duan was elected an academican of the Academia Sinica for his scholarly contributions. In 2013, he became a fellow of the Society for Financial Econometrics.

Prof Duan completed his undergraduate education at the National Taiwan University, received an MBA from the State University of New York at Albany, followed by a PhD in finance from the University of Wisconsin-Madison. Prof Duan’s research expertise is in financial engineering and risk management. He is known for his early work on developing the GARCH option pricing model and more recent corporate default research in connection with CRI. In addition to numerous scholarly publications on derivative securities, financial time series and risk management, he has written a book and occasionally contributes media commentaries on current financial/economic events.

Session Chair



Prof Robert WASSON

Senior Research Fellow, Lee Kuan Yew School of Public Policy, National University of Singapore

Professor Robert (Bob) Wasson is a senior research fellow in the Lee Kuan Yew School of Public Policy at the National University of Singapore. Trained as a geomorphologist he began his career doing fundamental research into processes of landform creation, landscape history, and climate change. But working in the semi-arid lands of Australia made him painfully aware of the land and water degradation caused by domestic stock. This awareness grew during five years as a research fellow in the Department of Biogeography and Geomorphology at the Australian National University (ANU) where he worked in the Australian and Indian desert dune fields to unravel their history and formative processes. A career change came about when he joined the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO), charged with the task of working out how Australian landscapes and waterways had reached their current states following European settlement in 1788. It became clear that the methods of geology and geomorphology could be used to chart change but only environmental history could explain how and why change had occurred. So began a career involving both science and environmental history aimed at policy and management of river catchments. By working with natural resource managers he became aware of the constraints within which they work and has tried to fashion advice and science to meet the real world needs of policy makers and managers. But if relevant science is to be provided, one has to stay up to date and so some work of a more fundamental kind, which Prof Wasson has continued to do.

Leaving CSIRO he returned to the ANU where he became head of the Department of Geography and Human Ecology, dean of science, and then director of the Centre for Resource and Environmental Studies. These positions allowed him to return to research in Asia where he has worked in India, Pakistan, Nepal, Thailand, Myanmar, Indonesia, China, Malaysia, the Philippines, and Timor Leste. During this time he served on many Australian government water and land advisory committees, and continued his work with the International Geosphere and Biosphere Program (becoming deputy chair of the Science Committee) and the International Human Dimensions of Global Change Program.

Another change occurred when he became deputy vice chancellor of research at Charles Darwin University in the Australian tropics prior to joining NUS in 2011. This management role enabled some understanding of the workings of higher education policy and practice.

At NUS he has focused on histories of floods and human vulnerability to floods in northern Thailand, the Indian Himalayas, and northern Australia using multi-disciplinary methods and with many collaborators.

Risk Communication as a Strategic Activity



Prof Baruch FISCHHOFF

Howard Heinz University Professor, Department of Engineering and Public Policy, Institute for Politics and Strategy, Carnegie Mellon University

Risk communications can define an institution in the eyes of its publics. As a result, communications provide the need and the opportunity to reflect on that definition, making risk communication a strategic activity for institutions that accept the challenge. The talk will describe an approach to strategic risk communication that combines analytical methods and empirical science, and that is sensitive to human interactions, within an organization and with its publics.

Biography

Baruch Fischhoff is Howard Heinz University Professor, in the Department of Engineering and Public Policy and the Institute for Politics and Strategy at Carnegie Mellon University. He is a member of the US National Academy of Sciences and the National Academy of Medicine. He is past president of the Society for Judgment and Decision Making and of the Society for Risk Analysis. He has chaired the Food and Drug Administration Risk Communication Advisory Committee and has been a member of the Eugene (Oregon) Commission on the Rights of Women, the Department of Homeland Security Science and Technology Advisory Committee and the Environmental Protection Agency Scientific Advisory Board, where he chaired the Homeland Security Advisory Committee. He is a fellow of the American Psychological Association, the Association for Psychological Science, the Society of Experimental Psychologists, and the Society for Risk Analysis. His books include *Acceptable Risk*, *Risk: A Very Short Introduction*, *Judgment and Decision Making*, and *Counting Civilian Casualties*, and *Communicating Risks and Benefits*.

Communicating Diverse Risks and Benefits in Differentiated Contexts

Makiko MATSUO

Project Assistant Professor, Graduate School of Public Policy, The University of Tokyo

This presentation emphasizes that success in the public understanding of risk in part hinges on revealing and sharing different understandings of risk by diverse societal actors at different levels in differentiated contexts.

The presentation stresses that not only does “external” communication between the government and public or between the expert community and the public matter, but so does “internal” communication within the government (between ministries), and/or within the expert community (between different disciplines) which produces the “evidence” with which decision making must be improved.

For that purpose, it is important to visualize the different risk understandings/philosophies of experts in different disciplines and governmental agencies dealing with certain risks. Approaches such as the technology assessment (TA), joint fact-finding (JFF) and meta-governance perspectives are important in this regard. TA can be helpful in identifying both risk and benefit, JFF can be useful in identifying divergent perspectives of different actors, and the meta-governance perspective can ensure a holistic view. The Policy Alternative Research Institute and the Graduate School of Public Policy of the University of Tokyo has been engaging in these activities for many years. The presentation introduces some illuminative examples from our studies, such as radionuclides in food and the risk mapping/ranking of experts in Japan. It will then conclude with some suggestions for future possible research collaborations in a broader comparative Asia Pacific context.

Biography

Makiko Matsuo is project assistant professor at the Graduate School of Public Policy at the University of Tokyo. She received a Master of International Studies degree from the Graduate School of Frontier Sciences at the University of Tokyo in 2005 and a Doctor of Philosophy degree in March 2016. Her areas of concern are interdisciplinary in nature and cover such issues as risk governance, risk regulation, global health issues, food safety, interface issues between science and politics, technology assessment (TA), the international standards setting process, international harmonization, the Codex Alimentarius Commission, sustainability, etc.

She is the recipient of the 2013 Junior Award by the Society for Risk Analysis Japan (SRAJ) for contributions to the field of risk analysis by a scholar aged 40 or under. She was also awarded the Annual Meeting Best Paper Award from SRAJ for her paper entitled “Reconsidering Food Safety Governance – An analysis from Comparative study on institutional settings”.

Managing Complex Interconnected Risks: Diverse Risk Perceptions and Governance



Prof Yee-Kuang HENG

Graduate School of Public Policy, The University of Tokyo

This paper introduces research undertaken at the University of Tokyo's Complex Risk Governance Unit focusing on the interface between risk mapping / risk perceptions and the implications for governance. Drawing on cases in Japan, the United Kingdom, and Singapore, this paper highlights several principles of governance as well as policy frameworks to address divergent risk perceptions among diverse stakeholders. These range from developing a whole-of-government inter-agency approach, including bottom-up municipal-level local community risk perceptions, to drawing on behavioural sciences in assessing how individuals respond to risk communications. The paper also raises issues such as which 'experts' are identified and consulted by government agencies in the first place, and the extent to which such expert recommendations determine risk inclusion or exclusion in National Risk Assessment exercises.

Biography

Yee-Kuang Heng is professor at the Graduate School of Public Policy at the University of Tokyo. Before assuming his current position, he was associate professor at the Lee Kuan Yew School of Public Policy at the National University of Singapore, where he also served as assistant dean for research. Heng spent many years studying and then lecturing in Britain and Ireland. He graduated from the London School of Economics and Political Science (LSE) with a BSc (first class honours) and subsequently a PhD in international relations funded by a British Government research scholarship. After completing his PhD, he held faculty positions lecturing at Trinity College Dublin, in Ireland, and at the University of St Andrews, in the United Kingdom. His research interests lie at the intersection between risk, security studies and international relations. His work comprises peer-reviewed articles in journals such as *Security Dialogue*, *International Relations*, *Review of International Studies*, *Global Governance*, *International Relations of the Asia-Pacific*, and *International Politics*. His fourth and most recent book is *Managing Global Risks in the Urban Age: Singapore and the making of a Global City* (Routledge, 2016).

Closing Remarks



Prof HO Teck Hua

Deputy President (Research & Technology), Tan Chin Tuan Centennial Professor, National University of Singapore

Professor Ho Teck Hua is Deputy President (Research & Technology) and Tan Chin Tuan Centennial Professor at the National University of Singapore (NUS).

He is a prominent behavioural scientist with a PhD in decision sciences from the Wharton School of the University of Pennsylvania. He also has a bachelor of science with first class honours in electrical engineering and a master of science degree in computer and information sciences from NUS, and a master of arts in decision sciences from the Wharton School.

Prof Ho began his academic career at NUS in 1988 and remained an adjunct professor at the University starting in 1997. In 2011, he took on a part-time appointment as vice president (research strategy), and became director of the Centre for Behavioural Economics at NUS. In 2012, he became director of the NUS Global Asia Institute. He is a board member of the National University Health System, a member of the board of directors of the National Environment Agency, a fellow at the Singapore Civil Service College, and chair of a Research Advisory Panel for the Land Transport Authority. He is also the executive chairman of AI.SG, a national research and development programme.

Prior to his role as deputy president (research & technology), Prof Ho was the William Halford Jr Family Professor of Marketing at the University of California, Berkeley's Haas School of Business. He was also the director of the Asia Business Center and served as the Haas School's associate dean of academic affairs and the chair of the Marketing Group. He earned tenure at the Wharton School of the University of Pennsylvania, before which he was assistant professor of operations and technology management at the UCLA Anderson School of Management.

Prof Ho has published many significant works in refereed journals in the areas of economics, management science, and marketing. In 2014, a co-authored paper won the second place Wickham Skinner Best Paper Award from *Production and Operations Management*. He has also been a finalist for three of the most prestigious awards in marketing research, including the 2011 William F O'Dell Award, the 2006 John DC Little Best Paper Award, and the 2005 Paul Green Best Paper Award.

He is the first non-US citizen to be editor-in-chief of *Management Science*, the venerable flagship journal of the Institute for Operations Research and the Management Sciences, and one of the top journals for research in management. He has also been an associate editor for the *Journal of Marketing Research*, *Marketing Science*, and a co-editor for *Foundations and Trends in Marketing*.



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