



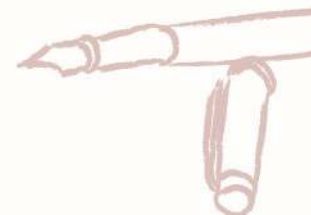
**NANYANG
TECHNOLOGICAL
UNIVERSITY**
SINGAPORE

Institute of Catastrophe Risk Management
**Ninth International
Symposium on
Catastrophe Risk Management**

CLOSING THE PROTECTION GAPS

– Challenges and Opportunities

7 AUGUST 2018 | SINGAPORE



NatCatDAX Alliance Founding Members:



NatCatDAX Consortium Partners:

Symposium Sponsors:

WELCOME MESSAGE



Professor Haresh C Shah
Professor Emeritus,
Stanford University

Chairman,
International Advisory
Board, ICRM

On behalf of the NTU's Institute of Catastrophe Risk Management (ICRM), it is my great pleasure to welcome you to the Ninth International Symposium on Catastrophe Risk Management, being held at the Grand Copthorne Waterfront Hotel, Singapore. I am delighted to welcome you all to this annual event which has become a tradition in Singapore for the ICRM as well as for the insurance/reinsurance industry.

This year's Symposium theme is, "Closing the Protection Gaps – Challenges and Opportunities". This theme is strongly motivated by Asia's need to close the natural catastrophe protection gap and to find mechanisms to ensure that the recent Asian prosperity gains are not set back by the economic and social disruptions that natural disasters can bring. Under Asia's typical environment of low insurance penetration, we see four enabling levers for such a mechanism which are: technology and data, product innovation, research and development, and finally an interested and engaged ASEAN market. Such levers will also greatly facilitate a significantly bigger role of insurance/reinsurance towards reducing the financial impact of natural disasters and improving disaster resilience in Southeast Asia.

I wish you all very successful discussions and a very productive conference.



Prof Tso-Chien PAN
Executive Director, ICRM

It is my great pleasure and honour to invite you to the Ninth International Symposium on Catastrophe Risk Management.

The ICRM Symposium series has been a forum for sharing the latest ideas and research in the continuously evolving risks of natural catastrophe, and this Ninth Symposium focuses on "Closing the Protection Gaps – Challenges and Opportunities" and is aligned with ICRM's major initiative on Natural Catastrophe Data Analytics Exchange (NatCatDAX). In essence, this 9th ICRM Symposium will address usefulness of robust data of assets exposed to natural catastrophes in Asia in general and Southeast Asia in particular.

We at ICRM would like to thank our key supporters of the Natural Catastrophe Data Analytics Exchange (NatCatDAX) Initiative and specifically the NatCatDAX Founding Members of Aon, China Re, MSIG, Renaissance Re and RMS for their generous support. Of course, we are most grateful to MAS for their strong support and the necessary core funding of the NatCatDAX Initiative.

We also thank our continuing Symposium sponsors, MAIPARK and Sinotech Engineering Consultants as well as the many individuals and organizations who have contributed towards making the symposium series possible. Special thanks go to our invited speakers and the participants. Outside of the Symposium, we encourage you to seize the ample opportunities to explore Singapore a most vibrant city of Asia.

SYNOPSIS

The Institute of Catastrophe Risk Management (ICRM) was launched by Nanyang Technological University, Singapore, in January 2010 with a vision to become Asia's leading research institute in catastrophe risk modeling and management. Over the years, ICRM has conducted eight Annual International Symposia on important topics including food and water security and climate change, black swan events, extreme events in Asia Pacific, financing natural catastrophes in Asia, public-private partnership in managing catastrophe events, mega-cities of Asia and their evolving risks, and most recently addressing the gap of natural catastrophe data in Southeast Asia through the *Natural Catastrophe Data Analytics Exchange (NatCatDAX) Initiative* in 2017. This Ninth Annual Symposium will build upon recent symposia insights that have focused on data and the NatCatDAX Initiative. The Ninth Symposium theme is:

Closing the Protection Gaps – Challenges and Opportunities

This theme is strongly motivated by Asia's need to close the natural catastrophe protection gap and to find mechanisms to ensure that the recent Asian prosperity gains are not set back by the economic and social disruptions that natural disasters can bring.

Under Asia's typical environment of low insurance penetration, we see four enabling levers for such mechanisms which are: technology and data, product innovation, research and development, and an interested and engaged ASEAN market. Such levers will also greatly facilitate a significantly bigger role of insurance / reinsurance towards reducing the financial impact of natural disasters and improving disaster resilience in Southeast Asia.

The Ninth ICRM Annual Symposium will evolve along several overlapping and interacting subthemes addressing:

- What is our current understanding of the gap between insured and uninsured economic losses? This gap is hugely driven by concentration of assets and people into megacities located in catastrophe exposed zones with a similar trend developing for industrial clusters. For example, it has been reported that flooding and storms in Asia caused well over USD 10 billion of economic losses during the month of July 2017 only.
- Increasing the use of parametric risk transfer insurance products – can we take stock of what the emerging opportunities and challenges exist in developing and implementing such products? Typically, parametric risk products take the form of risk pools and catastrophe bonds, for which the NatCatDAX Initiative can assist towards developing robust exposure and loss data. Progress is being made in activating the Southeast Asia Disaster Risk Insurance Facility (SEADRIF) as a regional catastrophe risk pool. Furthermore, regional and international insurers have launched pilot schemes to introduce parametric insurance products in the region. However further advancement of such parametric products requires coordination and cooperation with national governments, sub-sovereign and non-governmental organizations. How can academic institutions such as ICRM and the industry help?
- Developing new parametric products – What are the challenges in risk modeling and minimization of the basis risk requiring access to robust exposure and loss data? How can product deployment technologies help minimize the costs of distribution and disbursement of the pay-outs? What are the current advancements in remote sensing technologies, financial technologies & engineering, and InsurTech?

Renowned speakers from the re/insurance industry, regulators, governments, international organizations, modeling agencies, and research institutions will be invited to share their experiences, ambitions, and goals towards measurable reduction of the Protection Gap.

The sessions will also facilitate productive discussions with the delegates via panel discussions. We hope that a key outcome of the Symposium is to help spur collective action toward narrowing of the Protection Gap, and we invite your participation and contribution towards this effort.

PROGRAMME

0820 | Registration and Arrival

SESSION 1: Opening Session

0900 | **Welcome Greetings**
Professor Tso-Chien Pan
Executive Director,
Institute of Catastrophe Risk Management
Nanyang Technological University

0910 | **Presentation 1**
**Future of Cat Insurance Expansion -
An Asian story**
Professor Haresh C Shah
Professor Emeritus, Stanford University
Chairman, International Advisory Board, ICRM

0930 | **Presentation 2**
**Closing the Protection Gap - What
would Success Look Like?**
Mr Malcolm C Steingold
Former CEO, Aon Benfield Asia Pacific
Member, International Advisory Board, ICRM

0950 | **Presentation 3**
Insuring Asian Resilience
Mr Rowan M Douglas
CBE; Head of Capital, Science & Policy
Practice, Willis Towers Watson
Member, International Advisory Board, ICRM

1010 | Morning Refreshment

SESSION 2: Reducing the Protection Gap - Cross National Views

1040 | **Presentation 4**
**Lessons Learned from International
Catastrophe Pools with Applications to
Financing Asia's Exposure to Extreme
Weather**
Professor Shaun S Wang
FCAS; Nanyang Business School
Nanyang Technological University

1100 | **Presentation 5**
**From CCRIF to SEADRIF: WB's Efforts
in Developing Cat Pool Solutions and
Lessons Learned**
Mr Francis Ghesquiere
Practice Manager
Urban Development and Disaster Risk
Management, East Asia & Pacific Region
The World Bank

1120 | **Presentation 6**
**Closing the Protection Gap: Lessons
learned from an insurer's global
initiatives**
Mr Kenrick Law
Regional CEO
Head of P&C Client Management, Asia Pacific
Allianz SE Reinsurance Branch Asia Pacific
Member, International Advisory Board, ICRM

1140 | **Presentation 7**
**Natural Catastrophe Modelling & Risk
Transfer Solutions**
Mr Hemant Nagpal
Director, Model Product Management
Risk Management Solutions

1200 | **Panel Discussion**
Panel Chair:
Mr Malcolm C Steingold
Former CEO, Aon Benfield Asia Pacific
Member, International Advisory Board, ICRM

Panelist:

1. **Professor Shaun S Wang**, FCAS; Nanyang Business School, Nanyang Technological University
2. **Mr Francis Ghesquiere**, Practice Manager, Urban Development and Disaster Risk Management, East Asia & Pacific Region, The World Bank
3. **Mr Kenrick Law**, Regional CEO, Head of P&C Client Management, Asia Pacific, Allianz SE Reinsurance Branch Asia Pacific
Member of International Advisory Board, ICRM
4. **Mr Hemant Nagpal**, Director, Model Product Management, Risk Management Solutions

1230 | Lunch Break

SESSION 3: Risk Pooling - Regional Views

1330 | **Presentation 8**
**Establishing Exposure Databases for
Disaster Insurance Purposes in the
Philippines: Solutions and Lessons
Learned Applicable for the Asian
Region**
Dr Fouad Bendimerad
Ph.D., P.E.
Chairman and Executive Director
Earthquakes and Megacities Initiative

1350 | **Presentation 9**
**Trends in Losses and Insurance Gap of
Natural Disasters Globally and for
Southeast Asia**
Professor Peter Höeppe
Chair of Munich Climate Insurance Initiative
Former Head, Geo Risks Research of Munich Re
Adjunct Professor, ICRM, NTU

PROGRAMME

1410 | **Presentation 10**
Bridging the Nat Cat Protection Gap via Digital Solutions
Mr James Park
Regional Head of Property Treaty Underwriting (India, Japan, Korea, and South East Asia), Munich Re

1430 | **Presentation 11**
Maipark's Experience as a National Pool
Mr Fiza Wira Atmaja
Senior Vice President, Group Head of Research, Development and Innovation, PT Reasuransi MAIPARK, Indonesia

1450 | **Presentation 12**
China Pilot Nat Cat Insurance Schemes: An Effective Way to Enlarge the Insurance Penetration
Dr Junhua Zhou
Director of China Reinsurance Catastrophe Research Center, China Reinsurance (Group) Corporation
Head of Innovative Business Department, China Property & Casualty Reinsurance Company

1510 | **Panel Discussion**
Panel Chair:
Mr Rowan M Douglas
CBE; Head of Capital, Science & Policy Practice, Willis Towers Watson
Member of International Advisory Board, ICRM
Panelist:
1. Dr Fouad Bendimerad, Ph.D., P.E., Chairman and Executive Director, Earthquakes and Megacities Initiative
2. Professor Peter Höeppe, Chair of Munich Climate Insurance Initiative, Former Head, Geo Risks Research of Munich Re
Adjunct Professor, ICRM, NTU
3. Mr James Park, Regional Head of Property Treaty Underwriting, (India, Japan, Korea, and South East Asia), Munich Re
4. Mr Fiza Wira Atmaja, Senior Vice President, Group Head of Research, Development and Innovation, PT Reasuransi MAIPARK, Indonesia
5. Dr Junhua Zhou, Director of China Reinsurance Catastrophe Research Center, China Reinsurance (Group) Corporation
Head of Innovative Business Department, China Property & Casualty Reinsurance Company

1540 | **Afternoon Refreshment**

SESSION 4: Enabling Parametric Risk Transfer Solutions

1610 | **Presentation 13**
GEM Global Hazard and Risk Model for Asia
Dr Marco Pagani
GEM Seismic Hazard Coordinator
Global Earthquake Model (GEM) Foundation

1630 | **Presentation 14**
Pre- & Post-Earthquake Applications of Large-Scale Dynamic Analysis of Cities
Professor Xinzheng Lu
Civil Engineering Department
Tsinghua University, Beijing, China

1650 | **Presentation 15**
Insurance that Pays Out without Proof of Loss?
Dr Alexander Pui
Natural Catastrophe Manager (APAC)
Swiss Re Corporate Solution

1710 | **Presentation 16**
Protection Gap for Indirect Business Interruption
Dr Gordon Woo
Catastrophist, Risk Management Solutions, London, UK
Adjunct Professor, ICRM, NTU

1730 | **Panel Discussion**
Panel Chair:
Professor Edmond Lo
Deputy Director, Institute of Catastrophe Risk Management, NTU
Panelist:
1. Dr Marco Pagani, GEM Seismic Hazard Coordinator, Global Earthquake Model (GEM) Foundation
2. Professor Xinzheng Lu, Civil Engineering Department, Tsinghua University, Beijing, China
3. Dr Alexander Pui, Natural Catastrophe Manager (APAC), Swiss Re Corporate Solution
4. Dr Gordon Woo, Catastrophist, Risk Management Solutions, London, UK; Adjunct Professor, ICRM, NTU

1800 | **Closing Remarks**
Professor Tso-Chien Pan
Executive Director,
Institute of Catastrophe Risk Management
Nanyang Technological University

1810 | **Cocktail Reception**

1930 | **End**

POSTER SESSION

Natural Catastrophe Data Analytic Exchange (NatCatDAX) Initiative: Databases

- 1. Automatic Extraction of Urban Building Area and Height using High Resolution Satellite Imagery**
Assoc Prof Edmond Y.M. Lo, Prof Tso-Chien Pan and Dr Velautham Daksiya
Institute of Catastrophe Risk Management, NTU, Singapore
Mr Kuo-Shih Shao, Mr En-Kai Lin, Mr Yi-Rung Chuang and Mr Kuan-Yi Lee
Disaster Prevention Technology Research Center
Sinotech Engineering Consultants, Inc., Taipei, Taiwan
- 2. Building Attribute Ruleset for Taipei Building Stock**
Mr Kuo-Shih Shao, Mr En-Kai Lin, Mr Yi-Rung Chuang and Mr Kuan-Yi Lee
Disaster Prevention Technology Research Center
Sinotech Engineering Consultants, Inc., Taipei, Taiwan
Prof Tso-Chien Pan and Assoc Prof Edmond Y.M. Lo
Institute of Catastrophe Risk Management, NTU, Singapore
- 3. Estimating Building Value from Capital Stock – Taipei, Taiwan**
Ms Mansi Kalra, Adj Prof Pane Stojanovski, Assoc Prof Edmond Y.M. Lo and Prof Tso-Chien Pan
Institute of Catastrophe Risk Management, NTU, Singapore
- 4. Harvesting Loss and Damage Information of Disasters by Automated Analytics of Online News**
Assoc Prof Kezhi Mao
School of Electrical & Electronic Engineering, NTU, Singapore
Mr Qi Li
Institute of Catastrophe Risk Management, NTU, Singapore

Nat Cat Risk Studies in Asian Cities

- 5. Assessing Spatial and Temporal Urban Growth Patterns in Major Southeast Asian Cities**
Mr Shankar Acharya K, Assoc Prof Edmond Y.M. Lo and Dr Pradeep Mandapaka
Institute of Catastrophe Risk Management, NTU, Singapore
Assoc Prof Kevin Xiao Gaoxi
School of Electrical & Electronic Engineering, NTU, Singapore
- 6. Evaluation of Natural Catastrophe Impact on the Pearl River Delta (PRD) Region - Earthquake Risk**
Prof Tso-Chien Pan, Assoc Prof Edmond Y.M. Lo and Dr Wenqi Du
Institute of Catastrophe Risk Management, NTU, Singapore
Prof Cheng Su, Dr Heqing Mu and Dr Yichuan Deng
South China University of Technology
Dr Huiqiang Zuo
China Re
- 7. Evaluation of Natural Catastrophe Impact on the Pearl River Delta (PRD) Region - Flood Risk**
Prof Tso-Chien Pan, Assoc Prof Edmond Y.M. Lo and Dr Wei Jian
Institute of Catastrophe Risk Management, NTU, Singapore
Assoc Prof Adam Douglas Switzer
Asian School of the Environment, NTU, Singapore
Dr Linlin Li
Earth Observatory of Singapore, NTU, Singapore
Prof Cheng Su, Prof Xiangju Cheng, Assoc Prof Zhaoli Wang and Dr Chengguang Lai
South China University of Technology
Dr Huiqiang Zuo
China Re
- 8. Macro-Level Risk Assessment in Megacities**
Prof Tso-Chien Pan and Ms Gizem Mestav Sarica
Institute of Catastrophe Risk Management, NTU, Singapore
- 9. Modelling of Multi-Sectoral Critical Infrastructure Interdependencies for Vulnerability Analysis**
Dr Jiwei Lin, Prof Tso-Chien Pan and Assoc Prof Edmond Y.M. Lo
Institute of Catastrophe Risk Management, NTU, Singapore

Modelling of Nat Cat Hazards

- 10. Application of Microtremor Array Recordings for the Estimation of S-Wave Velocity Structure of Singapore**
Dr Meya Yanger Walling and Prof Tso-Chien Pan
Institute of Catastrophe Risk Management, NTU, Singapore
- 11. Modelling of Cold Surges in South China**
Mr Anupam Kumar and Assoc Prof Edmond Y.M. Lo
Institute of Catastrophe Risk Management, NTU, Singapore
Assoc Prof Adam Douglas Switzer
Asian School of the Environment, NTU, Singapore
- 12. Spatiotemporal Patterns of Rainfall Extremes in Southeast Asia: Implications for Flood Risk Assessment**
Dr Pradeep Mandapaka, Dr Velautham Daksiya and Assoc Prof Edmond Y.M. Lo
Institute of Catastrophe Risk Management, NTU, Singapore