



**NANYANG  
TECHNOLOGICAL  
UNIVERSITY**  
SINGAPORE

Institute of Catastrophe  
Risk Management

Tenth International Symposium  
on Catastrophe Risk Management

**TOWARDS VIABLE DISASTER RISK  
FINANCING SOLUTIONS FOR SE ASIA**  
– LEARNING FROM GLOBAL EXPERIENCES, SUCCESSES AND CHALLENGES

1 AUGUST 2019 | SINGAPORE



NatCatDAX Alliance Founding Members:



NatCatDAX Consortium Partners:



Symposium Sponsor:





Prof Tso-Chien PAN  
Executive Director, ICRM

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

The Institute of Catastrophe Risk Management (ICRM) Symposium series has been a forum for sharing the latest ideas and research in the continuously evolving risks of natural catastrophe. This Tenth Symposium focuses on “Towards Viable Disaster Risk Financing Solutions for SE Asia – Learning from Global Experiences, Successes and Challenges” and is aligned with ICRM’s major initiative on Natural Catastrophe Data Analytics Exchange (NatCatDAX) on high-quality exposure datasets as well as the use of such datasets in disaster risk financing. In essence, this 10th ICRM Symposium will address usefulness of robust data of assets exposed to natural catastrophes and the roles of high-quality dataset in disaster risk financing for 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 sponsor 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.

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 nine 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 more recently addressing the financial protection gap as well as the natural catastrophe data gaps in Southeast Asia through the *Natural Catastrophe Data Analytics Exchange (NatCatDAX) Initiative* in 2017, together with an upcoming new initiative planned in 2019 on *ASEAN Disaster Risk Financing and Insurance – Phase 2 (ADRFI-2)*. This Tenth Annual Symposium will build upon recent symposia insights that have focused on data and the NatCatDAX Initiative. The Tenth Symposium theme is:

## **Towards Viable Disaster Risk Financing Solutions for SE Asia – Learning from Global Experiences, Successes and Challenges**

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. Already, the Association of Southeast Asia Nations (ASEAN) has launched the ASEAN Disaster Risk Financing and Insurance Program (ADRFI) which would function as a central coordinating platform for the development of such risk management programs in the region.

The Tenth ICRM Annual Symposium will leverage on last year's theme of closing the protection gaps by expanding into the domain of sovereign risk financing. Reasons for this is recognition of the fact that viable solutions cannot be achieved without a strong engagement of the governments and knowing how they see catastrophe risk financing from their sovereign perspectives. Given the size of the population and assets at risk, SE Asia urgently needs to develop viable disaster risk financing solutions.

The Symposium will evolve along several overlapping and interacting subthemes addressing global experiences, successes and challenges. These cover:

- How to bring governments into the process to overcome political and policy hurdles. Which schemes make more sense, given the SE Asian geopolitical context. Within this context, what would be proper roles for the private (re)insurance sector.
- Technical aspects of what is at risk, exposure and risk quantification, and articulation of feasible risk financing alternatives.

Renowned speakers from government agencies, regulators, international organizations, (re)insurance industry, modeling agencies, and research institutions will be invited to share their experiences and advices towards viable disaster risk financing solutions for SE Asia. 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 actions towards developing viable disaster risk financing solutions and narrowing of the protection gap. We invite your participation and contribution towards this effort.

# PROGRAMME

0830 | **Registration and Arrival**

## SESSION 1: Opening Session

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

0910 | **Opening Address**  
**Ms Jacqueline Loh**  
Deputy Managing Director, Markets & Development  
Monetary Authority of Singapore

0920 | **Launch of the ASEAN Disaster Risk Financing and Insurance Programme Phase 2 (ADRFI-2) Dual Programme Offices**

0930 | **Presentation 1**  
**Insuring the Protection Gap: Vision, Challenges and Opportunities**  
**Mr Jonathan D.A. Paradine**  
Chief Executive, Singapore Branch  
Renaissance Reinsurance Ltd;  
Member, ICRM International Advisory Board

0945 | **Presentation 2**  
**Sovereign Disaster Risk Financing and Catastrophe Insurance Pools – Academic Theory and International Case Studies**  
**Professor Shaun Wang**  
FCAS, CERA, Nanyang Business School, NTU

1000 | **Morning Refreshment | Poster Session**

## SESSION 2: Experts' Perspectives of Governments' Needs in Sovereign Disaster Risk Financing

1030 | **Presentation 3**  
**Key Enabling Factors for a Successful Disaster Risk Financing Strategy – the Example of Myanmar**  
**Professor Peter Höeppe**  
Munich Climate Insurance Initiative;  
Adjunct Professor, ICRM, NTU

1045 | **Presentation 4**  
**Science-based Catastrophe Risk Modelling Informs Risk Management and Prudential Regulations**  
**Ms Madeleine Varkay**  
International Advisor, Government of Canada;  
Member, Asia Pacific Financial Forum sub-working groups on Long-Term Investment and Disaster Risk Finance advising the G-20;  
Former, Principal Private Sector Development Specialist, Asian Development Bank

1100 | **Presentation 5**  
**Catastrophe Risk Modelling for Governments to Drive Risk Reduction and Innovative Financing**  
**Dr Robert Muir-Wood**  
Chief Research Officer  
Risk Management Solutions Ltd, London, UK

1115 | **Presentation 6**  
**Catastrophe Models for Resilience: Past Experience and Future Innovations**  
**Dr Roger Grenier**  
Senior Vice President  
Global Resilience Practice Leader  
AIR Worldwide, Boston, MA, USA

1130 | **Presentation 7**  
**How to Deal with the Consequences of Earthquakes**  
**Mr Bilal Türkmen**  
Deputy Secretary General  
Turkish Catastrophe Insurance Pool, Turkey

1145 | **Panel Discussion**  
**Panel Chair:**  
**Professor Shaun Wang**  
FCAS, CERA, Nanyang Business School, NTU

### Panelist:

1. **Professor Peter Höeppe**, Munich Climate Insurance Initiative; Adjunct Professor, ICRM, NTU
2. **Ms Madeleine Varkay**, International Advisor, Government of Canada; Member, Asia Pacific Financial Forum sub-working groups on Long-Term Investment and Disaster Risk Finance advising the G-20; Former, Principal Private Sector Development Specialist, Asian Development Bank
3. **Dr Robert Muir-Wood**, Chief Research Officer, Risk Management Solutions Ltd, London, UK
4. **Dr Roger Grenier**, Senior Vice President, Global Resilience Practice Leader, AIR Worldwide, Boston, MA, USA
5. **Mr Bilal Türkmen**, Deputy Secretary General, Turkish Catastrophe Insurance Pool, Turkey

1215 | **Signing Ceremony of Research Collaboration Agreement between ICRM, NTU and Sinotech Engineering Consultants, Inc.**

1230 | **Lunch Break | Poster Session**

## SESSION 3: Insurance Industry Perspectives and Aspirations

1330 | **Presentation 8**  
**Cat Risk Financing Options: Pilot Schemes Implemented in the Greater Bay Area of China**  
**Dr Junhua Zhou**  
Head, Catastrophe Research Centre of China Re Group;  
Head, Innovative Business Department of China Re P&C  
China Reinsurance (Group) Corporation

1345 | **Presentation 9**  
**The Role of the Public Sector as Enabler of Sustainable Risk Transfer Solutions in SE Asia**  
**Dr Philipp Servatius**  
 Senior Product Manager  
 Public Sector Solutions - Business Development  
 Vice President, Swiss Re

1400 | **Presentation 10**  
**Singapore Earthquake Risk Assessment Incorporating Building Height Information**  
**Mr Ken Kawabe**  
 Senior Researcher  
 Risk Assessment Section, Corporate Planning Department  
 MS&AD InterRisk Research & Consulting, Japan

1415 | **Presentation 11**  
**Bridging the Protection Gap in Agriculture: How Asian Governments are Mitigating the Climate Apartheid**  
**Dr Natalie Y.N. Lim**  
 Senior Broker, Agriculture  
 Aon Reinsurance Solutions

1430 | **Presentation 12**  
**How Climate Change Affects DRFI Demand in Southeast Asia**  
**Mr Augusto Hidalgo**  
 Head of Capital, Science & Policy Practice  
 Southeast Asia  
 Willis Towers Watson

1445 | **Panel Discussion**  
**Panel Chair:**  
**Dr Pane Stojanovski**  
 Cat Risk Research, LLC, USA  
 Adjunct Professor, ICRM, NTU

**Panelist:**

1. **Dr Junhua Zhou**, Head, Catastrophe Research Centre of China Re Group; Head, Innovative Business Department of China Re P&C, China Reinsurance (Group) Corporation
2. **Dr Philipp Servatius**, Senior Product Manager, Public Sector Solutions - Business Development, Vice President, Swiss Re
3. **Mr Ken Kawabe**, Senior Researcher, Risk Assessment Section, Corporate Planning Department, MS&AD InterRisk Research & Consulting, Japan
4. **Dr Natalie Y.N. Lim**, Senior Broker, Agriculture, Aon Reinsurance Solutions
5. **Mr Augusto Hidalgo**, Head of Capital, Science & Policy Practice, Southeast Asia, Willis Towers Watson

1515 | **Afternoon Refreshment | Poster Session**

## SESSION 4: Strategies, Technologies and Case Studies

1545 | **Presentation 13**  
**Monitoring of Land and Built Structures in Japan for Enhanced Risk Assessment**  
**Professor Masayoshi Nakashima**  
 President, Kobori Research Complex Inc;  
 Technical Counsellor, Kajima Corporation;  
 Professor Emeritus, Kyoto University;  
 President, International Association for Earthquake Engineering

1600 | **Presentation 14**  
**A Data Fusion Approach to Update Exposure Data based on BIM and Computer Vision**  
**Dr Deng Yichuan**  
 Deputy Director of BIM Centre  
 School of Civil Engineering and Transportation  
 South China University of Technology, Guangzhou, China

1615 | **Presentation 15**  
**Assessing & Quantifying Risk for Risk Management – Best Practice**  
**Ms Grace Lim**  
 Senior Treaty Underwriter  
 Allianz SE Reinsurance Branch Asia Pacific

1630 | **Presentation 16**  
**Using Building Information, Innovative Financing, and Policy Change for Resilient Housing in Asia**  
**Dr Elizabeth Hausler**  
 Founder and CEO  
 Build Change, USA

1645 | **Panel Discussion**  
**Panel Chair:**  
**Professor Edmond Lo**  
 Deputy Director, ICRM, NTU

**Panelist:**

1. **Professor Masayoshi Nakashima**, President, Kobori Research Complex Inc; Technical Counsellor, Kajima Corporation; Professor Emeritus, Kyoto University; President, International Association for Earthquake Engineering
2. **Dr Deng Yichuan**, Deputy Director of BIM Centre, School of Civil Engineering and Transportation, South China University of Technology, Guangzhou, China
3. **Ms Grace Lim**, Senior Treaty Underwriter, Allianz SE Reinsurance Branch Asia Pacific
4. **Dr Elizabeth Hausler**, Founder and CEO, Build Change, USA

1715 | **Closing Remarks**  
**Professor Tso-Chien Pan**  
 Executive Director,  
 Institute of Catastrophe Risk Management  
 Nanyang Technological University

1725 | **Cocktail Reception**

1900 | **End**

## Natural Catastrophe Data Analytic Exchange (NatCatDAX) Initiative: Databases

- 1. Asset Exposure and Capital Stock for Indonesia, Philippines, Taiwan and Thailand**  
Dr Velautham Daksiya, Ms Mansi Kalra and Assoc Prof Edmond Y.M. Lo  
Institute of Catastrophe Risk Management, NTU, Singapore
- 2. Automatic Urban Building Area and Height Extraction using High Resolution Satellite Imagery – Taipei, Jakarta & Bangkok**  
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
- 3. Building Attributes Ruleset for Jakarta and Bangkok Building Stock**  
Mr Yi-Rung Chuang, Mr Kuo-Shih Shao, Mr En-Kai Lin and Mr Kuan-Yi Lee  
Disaster Prevention Technology Research Center  
Sinotech Engineering Consultants, Inc., Taipei, Taiwan  
Assoc Prof Edmond Y.M. Lo and Prof Tso-Chien Pan  
Institute of Catastrophe Risk Management, NTU, Singapore
- 4. Capital Stock Methodology – Top-down Approach for 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
- 5. Relevant Sentence Selection for Harvesting Loss and Damage Information of Disasters from 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

- 6. Assessing Linkages between Urban Growth and Road Infrastructure for 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
- 7. Changes in Rainfall Extremes in Southeast Asian Cities: 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
- 8. Estimation of Shallow S-Wave Velocity Structure of Singapore based on Microtremor Array Recordings**  
Dr Meya Yanger Walling and Prof Tso-Chien Pan  
Institute of Catastrophe Risk Management, NTU, Singapore
- 9. Evaluation of Natural Catastrophe Impact on the Pearl River Delta (PRD) Region - Earthquake Hazard**  
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, Guangzhou, China  
Dr Huiqiang Zuo  
China Re, Beijing, China
- 10. 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  
Prof Cheng Su, Prof Xiangju Cheng, Assoc Prof Zhaoli Wang and Dr Chengguang Lai  
South China University of Technology, Guangzhou, China  
Dr Huiqiang Zuo  
China Re, Beijing, China
- 11. Pearl River Delta (PRD) Intercity Risk Study: Economic Interdependency Using Input-Output Modelling**  
Ms Tinger Zhu  
School of Civil and Environmental Engineering, NTU, Singapore  
Ms Gizem Mestav Sarica and Prof Tso-Chien Pan  
Institute of Catastrophe Risk Management, NTU, Singapore
- 12. Probabilistic Seismic Hazard Assessment for SE Asia**  
Dr Chung-Han Chan  
Earth Observatory of Singapore, NTU, Singapore
- 13. Using Macro-Level Exposure Indicators for Future Disaster Risk Assessment in Megacities**  
Ms Gizem Mestav Sarica and Prof Tso-Chien Pan  
Institute of Catastrophe Risk Management, NTU, Singapore