



THE INTERNATIONAL EMERGENCY MANAGEMENT SOCIETY - TIEMS

**Proceedings of the International Emergency Management Society  
(TIEMS)**

**26<sup>th</sup> TIEMS Annual Conference**

***Toward the Bright Future of Safety***

Edited by: Snjezana Knezic and Meen Bahadur Poudyal Chhetri

Goyang, Korea, November 12 - 15, 2019

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**26<sup>th</sup> TIEMS Annual Conference**

***Toward the Bright Future of Safety***

**November 12 - 15, 2019  
Goyang, Korea**

**Organised by:**

TIEMS, The International Emergency Management Society  
Address: Rue Des Deux Eglises 39, 1000 Brussels, Belgium.  
Executive Office Postal Address is: Østvangveien 29, 0588 Oslo, Norway

**Co-organized by:**

TIEMS Korea Chapter jointly with the Korean Society of Disaster & Security

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## **WELCOME ADDRESS**

My warmest greetings to The International Emergency Management Society (TIEMS) as it hold the 26<sup>th</sup> annual conference and all the participants of this conference. On behalf of the local organizing committee , TIEMS Korea Chapter jointly with the Korean Society of Disaster & Security (KSDS), it gives us the greatest honor and pleasure to invite you to attend TIEMS 2019 Annual Conference to be held in Goyang, South Korea at the KINTEX from November 12-14, 2019.

My great appreciations goes to K. Harald Drager of the TIMES President who attend this meaningful conference although he had recent surgery. Also, I would like to thank to Gye-Jo Kim, Vice minister, Ministry of the Interior and Safety, and Sarah Wade-Apicella, UN Office of Disaster Risk Reduction to attend at the conference for the congratulatory remarks.

As we all know, Korea recently experience Typhoon 'Tapha' and still is responding to 'African swine fever'. Under the circumstances, the conference gives opportunities to discuss on-going issues and find various solutions from the experts from all over the world. The local organizing committee is very excited to be hosting this great conference on 'Toward the Bright Future of Safety.' We hope to follow the successful footsteps of the TIEMS conferences in Kiev, Ukraine in 2017 and Manila, Philippines in 2018.

We are planning an excellent spectrum of topics ranging from disaster risk reduction, climate change, natural disaster analysis, Technology for first responders, TQC certification, technical sessions, World Bank study to Korean sessions to present on-going issues. In an interconnected and interdependent world, coordination and collaboration between cities, provincial, national, international agencies and non-governmental organizations have become critical to the promotion of disaster management, disaster risk reduction and climate change mitigation.

This conference will explore best practices and emerging technologies, to facilitate the coordination of valuable resources and urban planning strategies to build resilient communities. There will be about 100 papers by the experts from 16 countries for you to present at this conference. Presentations from International and Korean experts will provide valuable insights and the interactive workshops will create an exceptional opportunity to discuss national and international perspectives.

The members of the local organizing committee in Goyang are very proud and privileged to be hosting the 2019 TIEMS Annual Conference and look forward to welcoming you to our country. Please you may network with your colleagues in what we hope to be a fabulous conference.

Sincerely

**Ji-Hyeob Ryu, President, KSDS, Hanlyo Univ.  
TIEMS Korea Chapter**

## Welcome to TIEMS 26<sup>th</sup> and 2019 Annual Conference in Goyang, Korea from TIEMS President

In a time of increasing number and severity of disasters, global cooperation and coordination are more vital than ever before. By working together and sharing of experiences and exchange of views among the experts of different countries we can learn from each other to develop better methods and systems and advocate for better policies in emergency and disaster management, to be standardized and implemented all over the world. TIEMS conferences and workshops worldwide are such platforms where all stakeholders can meet and exchange experiences and views and focus on different global and local important topics and issues in emergency and crisis management. TIEMS 2019 Annual Conference in Goyang in Korea is TIEMS 26<sup>th</sup> Anniversary, and since I have been with the organization since its establishment in Washington DC. in 1993, it is with great pleasure to recognize that TIEMS has grown to a worldwide organization and is now a “mature” and recognized worldwide organization. The 2019 Annual conference is focusing on local and international important issues in emergency management and crisis response. This should form a good meeting place between the locals and international experts, and give all the opportunity to learn from each other and exchange experiences and find better solutions, which can improve local and international preparedness for disastrous events, and build more resilient societies worldwide.

TIEMS local organizing committee in Korea is the host of this conference, and the members of the committee have done an excellent job for preparing the conference, and I like to thank them all for the commitment and dedication to make an excellent conference. This year's TIEMS conference is hosted by TIEMS Korea Chapter jointly with Korean Society of Disaster and Security. Both international and local presentations of high quality form up a comprehensive program comprising 4 workshops and 50 oral and poster presentations, and the event is very international with contributions of speakers from 16 countries/territories. A guided tour to **Songpa Safety Experience Education Center** ([\*Public institution for safety education using experience, practice, multimedia, VR\*](#)) and **Lotte Tower (Safety Control Center)**. Lotte Tower is the newly constructed modern building which is the highest in Korea and the 5th highest in the world (555m, 123 floor). This conference program will certainly make the 4 days TIEMS 2019 annual conference in Goyang, Korea to a memorable event.

The papers will be included in TIEMS 2019 Annual Conference Proceedings, and some full papers will be peer reviewed and published in an international recognized journal. Many thanks go to Dr. Meen Chhetri, Chair of TIEMS Paper Review Committee, for reviewing all papers together with Dr. Thomas Robertson, and giving good advice to the authors, seeing to it that all papers are of high quality. Many thanks also go to Dr. Snjezana Knezic for assisting in paper review and putting together the conference proceedings. Also great thanks to the conference program committee, local organizing committee and the volunteers, as well as welcome and keynote speakers. A special thanks goes to Dr D. K. Yoon, who has been appointed the Korean host, and whom I have mostly been communicating with in developing the TIEMS 2019 annual conference program.

We have also 4 company sponsors for the 2019 annual conference, which with their generous sponsorship has made this conference possible. It has been great to work with such a professional and dedicated team of professionals. I welcome all participants to TIEMS 2019 Annual Conference in Goyang, Korea, 12 - 15 November 2019.

Oslo 31<sup>st</sup> October 2019

K. Harald Drager, TIEMS President

### **Conference Chair**

Kåre Harald DRAGER, Professor, President of The International Emergency Management Society TIEMS (Norway)

### **Conference Co-chair**

Soon-Joo Wang, Professor, Medical Doctor, Hallym University Medical Center (South Korea)

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- **Meen Bahadur Poudyal CHHETRI**, President of Nepal Center for Disaster Management and Chair of TIEMS Paper Review Committee (Nepal)
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- **Young Jai LEE**, Professor, Dongguk University, and Principle Investigator of Global DRR Technology Platform (South Korea)
- **George MARKOWSKY**, Professor, Missouri University of Science and Technology, Chair of TIEMS Academy (USA)

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- **Dong-Heon Kim**, Ph.D. President of Disaster Safety Institute, Scientific Program Committee of Korean Society of Disaster and Security
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- **Tae-Shik Lee**, Ph.D. External Cooperation/Public Relation Committee of Korean Society of Disaster and Security
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- **Seunghee Park**, Ph.D. Associate Professor, Sungkyunkwan University, School of Civil, Architectural Engineering & Landscape Architecture, Scientific Program Committee Member of Korean Society of Disaster and Security

## Plenary sessions' full papers, presentations and abstracts

### Plenary Session 1

Kåre Harald Drager

Emergency Management around the World - Challenges and Lessons Learned

Sangseom Jeong

Adaptation technology of infrastructure under climate change

Mare Lo, Josef Leitmann

Public Safety: The State of Civil Protection Around the World

Seok Hong Lee

[Safety Issues in Construction Market Facing Industry 4.0](#)

*Presentation*

Guosheng Qu

[The New National Emergency Management Systems in China, its Focus, Experience so far, and Future Plans](#)

*Abstract*

### Plenary Session 2

Bent-Ove Jamtli

[Search and Rescue \(SAR\) in the Arctic, Status and Challenges](#)

*Abstract*

Ja-Yeong Gu

[Current Status and Future Tasks for Marine Disaster Management in Korea](#)

*Abstract*

Thomas Robertson

[Emergency Benefits and Risks of Artificial Intelligence](#)

*Full paper*

Sangjun Im

[Engineering Design Considerations for Small Debris-Flow Mitigation Structures](#)

*Abstract*

Dalibor Drljaca

[EU's RTD Programs, and the Participation of Non-EU countries in RTD Proposals](#)

*Full paper*



## Technical sessions' full papers, posters, presentations and abstracts

### Full papers, peer reviewed by TIEMS scientific and programme committee

*(In alphabetical order of the surname of the first author)*

Sandro Bologna

[A set of Good Practices and Recommendations for Smart City Resilience Engineering and Evaluation](#)

*Technical Session 7*

Yeon Woo Choi, Dong Keun Yoon

[Accessibility Vulnerability Analysis of Fire-Fighting Response Service Using Network Analysis in Seoul, Korea](#)

*Technical Session 1*

Mijin Choo, Dong Keun Yoon

[Examining the Effects of Community's Social Capital on Disaster Risk in Seoul, Korea](#)

*Technical Session 6*

Yusuf Eker

[Disaster Emergency Services and Humanitarian Activities with the Goal of Disaster Resilient Society in Northern Cyprus, National Achievements, International Challenges and Obstacles](#)

*Technical Session 1*

James Giles, Charles Du Plessis

[Training & Technology for Safer and More Effective Disaster Management](#)

*Technical Session 4*

Ji Hye Ha, Jung Eun Kang

[A Study on Flood Prediction Model Using Machine Learning: Focused on Busan Metropolitan City](#)

*Technical Session 2*

Moonhyun Hong, Sangseom Jeong

[Geodisaster-Induced Landslides and Debris Flows in Region Scale Area](#)

*Technical Session 5*

Woo Sik Kim, Dong Keun Yoon

[Examining Factors Contributing to Crime Occurrence in Urban Areas, Korea](#)

*Technical Session 4*

Snježana Knezić, Martina Baučić

[Social Media Based Emergency Decision Support System](#)

*Technical Session 3*

Yun Joo Lee, Ha Rim Kim, Soyeon Yoon, Dong Keun Yoon

[Examining the Disaster Response System for the Disabled in Korea](#)

*Poster Session*

Ji Yoon Lee, Jung Eun Kang

[Estimating Damage by Rising Sea Levels with a Focus on Busan Metropolitan City](#)

*Technical Session 5*

Bhaskara Rao Mulam

[MDRR into Development in the SAARC Region: Need for Integration of DRR into Development Activities and Strengthen Knowledge Management](#)

*Technical Session 4*

Lim Sehun, Jeong Kyungok, Lee Dongeun

[Applying the Perspective of Regional Competitiveness of Urban Resilience. A Study on Improvement of Life Safety Index](#)

*Poster Session*

Zhang Shifu, Xie Changhua, Mao Yuwen, Deng Xianyi, Zhang Dongmei, Li Cunjing

[Development and Application for Mobile Emergency Drainage System in Urban Flood Rescue](#)

*Technical Session 1*

Siviwe Shwababa, Rennifer Madondo, Roman Tandlich

[Assessing the Impact of Drought and Wild Fires Among Land Reform Beneficiaries Farms in South Africa](#)

*Poster Session*

Eunice P. Vhiriri, Richard K. Laubscher, Yoland Irwin, Roman Tandlich

[Water, Sanitation and Disaster Management in Isolated Settlements in the Pacific Islands](#)

*Technical Session 6*

Johnston Wong, Lina Lai, Candy Zhou

[Evaluating Crisis Intervention Practices with an EM Hexagon Model -- the Case of Four Chinese Cities.](#)

*Technical Session 7*

Mao Yuwen, Hu Yongpan, Qin Tingxin

[Development of Disaster Analysis and Rescue Treatment Standard in Plateau and Ultra Cold Area of China](#)

*Technical Session 5*

Bijia Zhang, Shufeng Xi, Yuyang Liu, Yuanyuan Jiao

[Natural Disaster Prevention and Mitigation System Based on Disaster Investigation and Assessment](#)

*Technical Session 5*

## Poster format

*(In alphabetical order of the surname of the first author)*

Yong-Sang Choi, Hyesook Jeon, Kwonmin Lee, Yeseul Lee, Eun-Gyu Park

[Study on the Effective Response for Disaster in Cambodia: Implications from Focus Group Interviews](#)

*Poster Session*

Myoungsun Han

[Installation of River Information Display System](#)

*Poster Session*

## Presentations

Vu Tuan Tran, Jihyun Lee, Junghyun Im, DaeKyo Jung, Seunghee Park

[A Conceptual Framework for an Intelligence Natural Disaster Management System](#)

*Technical Session 3*

## Abstracts

*(In alphabetical order of the surname of the first author)*

Inese Barbare

[The Impact of the Project ONBOARDMED on Development of Study Courses in Maritime Emergency Management](#)

*Technical Session 5*

Alex Fullick

[Reduce Fear - Increase Resiliency](#)

*Technical Session 2*

Phil Kyu Jung, Ji Yun Kim, Yung Il Yun

[A Study on the Current Status and Method of Seismic Retrofit of Public Facilities in Gyeonggi-do](#)

*Technical Session 6*

Jang-Gyeong Kim, Chang-Sam Jeong, Hyun-Han Kwon

[A Hierarchical Bayesian Approach to the Neyman-Scott Rectangular Pulse Model for a Joint Estimation of Model Parameters Across Stations](#)

*Poster Session*

Namgyun Kim, Jaehwan Kwak, Man-Il Kim

[Development of Decision Tree for Response Forest Fire Through the Comparative Case Analysis of Large Wildfire](#)

*Technical Session 3*

Gi Hwan Kwon, Jeong Rim Oh, Young Jin Son, Jun Hyung Park, Min Jung Kim  
[A Study on the Professional Development Plan for Disaster and Safety management in Korea](#)  
*Technical Session 2*

Chang Woo Lee, Sang-Hyeok Nam, Seonggon Kim  
[Practical Use of Geospatial Data for Extreme-temperature Disaster Response](#)  
*Technical Session 3*

Kyung Tae Lee  
[Through Analysis of Domestic Earthquake Data Relationship Between Scale and Epicenter Damage](#)  
*Technical Session 6*

Dong Eun Lee, Ki Hoon Cho, Ho Jin Jang, Dong Heon Kim  
[A Study on the Evaluation of the Vulnerabilities in Climate Change](#)  
*Technical Session 7*

Jean-Paul Monet, Anais Saint Jonsson, Pierre Schaller, Aurelia Mannaioni  
[International Crisis Management, How to Evaluate the Quality of Interoperability? Definition of a Methodology, Study Cases at National and International Level](#)  
*Technical Session 4*

Se Noori  
[Discussions on "The Right for Security" in Korea - Constitutional Amendment Proposal by the Government and Interpretation of the Current Constitution](#)  
*Technical Session 2*

Jaiho Oh, Mo-Ryang Hur, Ji-Won Oh, Hong-Hee Kim, Ji-Han Shim  
[Living Lab. in EDC: A Scientific Research Mesh Network for Future Disaster Management for Extreme Weather in the City](#)  
*Technical Session 4*

Hyungjun Park, Daejin Lee, Huiwon Yang, Junbeom Lee  
[Liquefaction Analysis of Earthquakes in Korea](#)  
*Technical Session 7*

Seongyun Park, Gwangsun Shin, Sanghun Lee  
[Implication of Earthquake Disaster Prevention System in Japan to Mitigate Earthquake Damage in Korea](#)  
*Technical Session 4*

Jaroslav Pejcoch  
[Pre-Accident Awareness Made Real](#)  
*Technical Session 7*

Jiyoung Rhee, Jaewon Shim, Taesun Chang, Nagyoung Kim  
[Fire Safety Plan at Occupation Area Under Bridge to Minimize Fire Damage on Bridge](#)  
*Poster Session*

Andre Samberg

[An Overview of the Current International Regulation and Standards for Disaster Risk Reduction and Civil Protection](#)

*Poster Session*

Jaewon Shim, Jiyoung Rhee, Taesun Chang, Nagyoung Kim

[Simulation and Test on Explosion Resistance of Tunnel Lining Concrete Using 3d-Autodyn and Shock Tube](#)

*Poster Session*

Dai Quoc Tran, Minsoo Park, Vu Tuan Tran, Dae-Kyo Jung, Seunghee Park

[A Survey on Machine Learning Approaches for Natural Disaster Management System](#)

*Technical Session 3*

Soon-Joo Wang

[New technologies in Emergency Situation: Focusing on Healthcare including Artificial Intelligence](#)

*Technical Session 1*

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