4th International Symposium on Geotechnical Safety and Risk (ISGSR 2013)

4-6 December 2013
Hong Kong
9:30-10:15 on 5 December 2013 (Thursday) at IAS Theatre
Suzanne Lacasse, Kaare Hoeg, Z.Q. Liu & F. Nadim
Technical Director
Norwegian Geotechnical Institute, Norway
"An homage to Wilson Tang: Reliability and risk in geotechnical practice - how Wilson led the way" (Wilson Tang Lecture)

10:45-11:25 on 5 December 2013 (Thursday) at IAS Theatre
D.V. Griffiths, J. Paiboon, J. Huang & Gordon A. Fenton
Professor
Colorado School of Mines, USA
"Use of random fields in probabilistic geotechnical analysis"

11:25-12:05 on 5 December 2013 (Thursday) at IAS Theatre
Hongwei Huang, W.W. Su & J. Zhang
Changjiang Professor
Tongji University, China
"Selecting the optimal probability model for geotechnical reliability analysis"

9:00-9:40 on 6 December 2013 (Friday) at IAS Theatre
Robert B. Gilbert, S. Lacasse & F. Nadim
Brunswick-Abernathy Professor
The University of Texas at Austin, USA
"Advances in geotechnical risk and reliability for offshore applications"

9:40-10:20 on 6 December 2013 (Friday) at IAS Theatre
H.N. Wong
Head of Geotechnical Engineering Office,
Civil Engineering and Development Department, Hong Kong SAR
"Is landslide risk quantifiable and manageable?"

10:50-11:30 on 6 December 2013 (Friday) at IAS Theatre
C.H. Juang, Lei Wang & Sey Atamturktur
Glenn Chair Professor
Clemson University, USA
"Robust design of geotechnical systems - A new design perspective"

11:30-12:10 on 6 December 2013 (Friday) at IAS Theatre
Martin Th. van Staveren
Van Staveren Risk Management VSRM
The Netherlands
"Integrated georisk management: crossing boundaries"
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The 4th International Symposium on Geotechnical Safety and Risk (4th ISGSR) was organised by the Hong Kong University of Science and Technology under the auspices of the Geotechnical Safety Network (GEOSNet; Chair, Daniel Straub; Co-chair Limin Zhang), Technical Committee TC 304 on Engineering Practice of Risk Assessment and Management (Chair, K.K. Phoon) and Technical Committee TC 205 on Safety and Serviceability in Geotechnical Design (Chair, Brian Simpson) of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE). The Symposium was also supported by Hong Kong Geotechnical Society, the Geotechnical Division of the Hong Kong Institution of Engineers, Chinese Institution of Soil Mechanics and Geotechnical Engineering, the Engineering Risk and Insurance Branch of China Civil Engineering Society, and American Society of Civil Engineers Hong Kong Section.


Safety, reliability, and risk assessment and management have attracted growing interests of the geotechnical community in recent years due to the frequent occurrences of natural and man-made disasters and the needs for safe and cost-effective design, construction and operations of infrastructures. At the same time there is an increasing expectation of the general public that requires the engineering community to provide quantitative information concerning risks posed by geotechnical hazards. The 4th ISGSR provided an excellent opportunity to better understand the geotechnical safety and risk management issues in engineering practices and research. The proceedings contain seven invited keynotes and 69 accepted papers from 28 countries and regions. Each accepted paper in the symposium proceedings was subject to review by two peers. These papers cover six themes: (1) geotechnical uncertainty and variability, (2) geohazards such as landslides, earthquakes and climate changes, (3) reliability and risk analysis, (4) reliability-based design and limit-state design in geotechnical engineering, (5) risk assessment and management in geotechnical engineering and infrastructural projects, and (6) practical applications.

We wish to thank the members of the International Advisory Committee and the Regional Organising Committee and the reviewers for their help. The gracious financial support of the K.C. Wong Education Foundation, HKUST, the National Basic Research Program of China and the Natural Science Foundation of China’s Oversea Collaborative Research Program is greatly appreciated.
Acknowledgement

The Regional Organising Committee would like to acknowledge the generous contributions and support of the following organizations that contributed to the success of the 4th International Symposium on Geotechnical Safety and Risk:

Geotechnical Safety Network (GEOSNet)
International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE)
   – TC 304: Engineering Practice of Risk Assessment and Management
   – TC 205: Safety and Serviceability in Geotechnical Design
The Hong Kong University of Science and Technology
K.C. Wong Education Foundation
National Basic Research (973) Programme (2011CB013500)
National Natural Science Foundation of China (51129902, 51225903)
Hong Kong Geotechnical Society (HKGES)
Geotechnical Division, the Hong Kong Institution of Engineers
Chinese Institution of Soil Mechanics and Geotechnical Engineering
Engineering Risk and Insurance Branch of China Civil Engineering Society
American Society of Civil Engineers (Hong Kong Section)

General Information

Venues

1) Conference: 5–6 December 2013
   Institute for Advanced Study (IAS), The Hong Kong University of Science and Technology (HKUST), Clear Water Bay, Kowloon.

2) Banquet, 19:00–21:00, 5 December 2013
   G/F Restaurant, HKUST

Operating Hours: Preparation Room & Registration Desk

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<thead>
<tr>
<th>Date</th>
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<th>Registration Desk inside IAS Hall</th>
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<td>8:15 – 18:45</td>
<td>8:15 – 18:45</td>
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<tr>
<td>6 December 2013</td>
<td>8:15 – 18:00</td>
<td>8:15 – 18:45</td>
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</tbody>
</table>

Emergency Contacts

1) Dr Limin Zhang   6231-4938
2) Dr Yu Wang      6856-8617
3) Dr Gang Wang    2358-7161

Police: 999
REGIONAL ORGANISING COMMITTEE
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Co-Chairs of the Technical Subcommittee           Y.C. Chan and Dianqing Li
Secretaries                                     Yu Wang and Gang Wang
Treasurer                                J.P. Wang

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K.T. Chau                                    Jinhui Li                  Kelvin K.V. Yuen
Tony C.T. Cheung                              Jack Pappin                
John Endicott                                L.G. Tham

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Guillermo Espin                              Laszlo Nagy                  Yu Wang
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Richard Bathurst                             Tim Länsivaara                Antonio Soriano
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Luigi Gallisto                                Iacint Manoliu                 Marco Uzielli
Peter Day                                    Trevor Orr                       Balazs Vasharelyi
Franco Francisca                             Sam Paikowsky                  Aida S. Zhakulin
Roger Frank                                  K.K. Phoon                      Limin Zhang
### 5 December 2013 Thursday

#### 8:15 – 18:45  Registration and Information

#### 9:00 – 10:15  Plenary Session  IAS Theatre
Co-Chairs: Limin Zhang and Y.C. Chan; MC: Gang Wang
Welcoming Speeches

#### 10:15 – 10:45  Coffee Break and Photo Taking  IAS Lobby

#### 10:45 – 12:05  Plenary Session  IAS Theatre
Co-Chairs: Chuangbing Zhou and Farrokh Nadim

#### 12:05 – 13:10  Lunch  IAS Lobby

#### 13:10 – 14:40  Parallel Sessions

<table>
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<tr>
<td>Reliability- and risk-based monitoring and site investigation</td>
<td>Geotechnical uncertainty and variability</td>
<td>Geohazards</td>
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<tr>
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<td>Venue: IAS Seminar Room 1</td>
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#### 14:40 – 15:10  Coffee Break  IAS Lobby

#### 15:10 – 16:40  Parallel Sessions

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<td>Performance evolution and risk assessment of high slopes in hydropower engineering in China</td>
<td>Influence of spatial variability on geotechnical design decisions</td>
<td>New developments in geotechnical analysis</td>
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<tr>
<td>Venue: IAS Theatre</td>
<td>Venue: IAS Seminar Room 1</td>
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<tr>
<td>Co-Chairs: Wenbo Lu and Dianqing Li</td>
<td>Co-Chairs: Murty Dasaka and Jinsong Huang</td>
<td>Co-Chairs: Bill Mok and Hong Zheng</td>
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#### 16:40 – 18:00  Laboratory Visits and Committee Meetings
Visit to HKUST’s geotechnical laboratories and geotechnical centrifuge facility. Tour starts at 16:50 in front of Registration Desk.
GeosNet and ISSMGE TC304 committee meetings (at IAS seminar rooms)

#### Banquet
19:00 – 21:00  HKUST G/Restaurant
# 6 December 2013 Friday

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<tr>
<td>8:15 – 18:45</td>
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<tr>
<td>9:00 – 10:20</td>
<td>Plenary Session IAS Theatre</td>
<td>IAS Theatre</td>
<td>Hsein Juang and Vaughan Griffiths</td>
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<td></td>
<td>9:00 – 9:40 Keynote 4: Robert B. Gilbert, S. Lacasse &amp; F. Nadim – “Advances in geotechnical risk and reliability for offshore applications”</td>
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<td>10:20 – 10:50</td>
<td>Coffee Break IAS Lobby</td>
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<tr>
<td>10:50 – 12:10</td>
<td>Plenary Session IAS Theatre</td>
<td>IAS Theatre</td>
<td>H.N. Wong and Robert Gilbert</td>
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<td></td>
<td>10:50 – 11:30 Keynote 6: C. Hsein Juang, Lei Wang &amp; Sez Atamturktur – “Robust design of geotechnical systems – A new design perspective”</td>
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<td>12:10 – 13:10</td>
<td>Lunch IAS Lobby</td>
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<td>Parallel Sessions</td>
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<td></td>
<td>Parallel Session A-3 Risk management in geotechnical engineering and construction projects</td>
<td>IAS Theatre</td>
<td>Martin van Staveren and Ken Ho</td>
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<td>Parallel Session B-3 Reliability and risk analysis (I)</td>
<td>IAS Seminar Room 1</td>
<td>Jianye Ching and Xu Li</td>
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<td>Parallel Session A-4 Reliability-based design and limit state design in geotechnical engineering (I)</td>
<td>IAS Theatre</td>
<td>Sam Paikowsky and Jinhui Li</td>
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<td>Parallel Session B-4 Reliability and risk analysis (II)</td>
<td>IAS Seminar Room 1</td>
<td>Lulu Zhang and Don Wang</td>
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<td>16:30 – 18:00</td>
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<td>Parallel Session A-5 Reliability-based design and limit state design in geotechnical engineering (II)</td>
<td>IAS Theatre</td>
<td>Armin Stuedlein and Yu Wang</td>
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<td></td>
<td>Parallel Session B-5 Geotechnical applications and case studies</td>
<td>IAS Seminar Room 1</td>
<td>Hongwei Huang and Zijun Cao</td>
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<td>18:00 – 18:30</td>
<td>Closing Ceremony</td>
<td>IAS Theatre</td>
<td>Daniel Straub and Yusuke Honjo</td>
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<td>Summary &amp; Vote of thanks</td>
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<td>ISGSR2015: Paul Cools</td>
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### Parallel Sessions: 5 December 2013, 13:10 - 14:40

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</table>
| **Reliability- and risk-based monitoring and site investigation**  
Co-Chairs: Timo Schweekendieck, Jason Papaioannou and Daniel Straub | **Geotechnical uncertainty and variability**  
Co-Chairs: Gang Wang and Ivan S.K. Au | **Geohazards**  
Co-Chairs: J.P. Wang and Raymond Cheung |
| Effect of inadequate site investigation on the cost and time of a construction project  
A.H. Albatal, H.H. Mohammad & M.E. Abd Elrazik | Quantifying epistemic uncertainty and aleatory variability of Newmark displacements under scenario earthquakes  
W. Du & G. Wang | Integrating seismic hazard analyses with geotechnical site characterization for liquefaction potential assessment in Kaohsiung area  
D. Huang & J.P. Wang |
| Probabilistic characterization of Young’s modulus using Markov Chain Monte Carlo simulation  
Z. Cao & Y. Wang | Reliability analysis of 640 m long soil retaining wall for an embedded highway construction  
Y. Honjo, Y. Otake, T. Kusano & T. Hara | Landslide considerations for low cost remedial works for the Karakorum Highway, Pakistan  
A.D. Mackay |
| Bayesian model updating of a tunnel in soft soil with settlement measurements  
I. Papaioannou, W. Betz & D. Straub | CPT-based Bayesian identification of underground soil stratigraphy  
K. Huang, Z. Cao & Y. Wang | Landslide mitigation considerations for low cost highway remedial works, East Timor  
A.D. Mackay |
| TBA | Characterization of three-dimensional random crack network in soil using CT test  
J.H. Li, L.M. Zhang & Y. Zhao | Stochastic simulation of earthquake ground motions using Wavelet packets and Kriging analysis  
Gang Wang |
| Using head monitoring for reliability updating of levees  
T. Schweekendieck | Uncertainty quantification by polynomial chaos expansion for geotechnical reliability-based analysis  
S.H. Marques, A.T. Gomes & A.A. Henriques | A risk-based active fault classification  
J.P. Wang |
| Geotechnical instrumentation monitoring for the construction of the West Kowloon Terminus of the Express Rail Link  
A.K.O. So, P.W.L Ko & V.K.W Man | Flood simulation considering probability of heavy rains and uncertainty of soil properties of earth-fill dams  
S. Nishimura, T. Shuku, H. Nagao & K. Fujisawa | Modelling techniques of submarine landslide in centrifuge  
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<td><strong>Performance evolution and risk assessment of high slopes in hydropower engineering in China</strong>&lt;br&gt;Co-Chairs: Wenbo Lu and Dianqing Li</td>
<td><strong>Influence of spatial variability on geotechnical design decisions</strong>&lt;br&gt;Co-Chairs: Dasaka Murty and Jinsong Huang</td>
<td><strong>New developments in geotechnical analysis</strong>&lt;br&gt;Co-Chairs: Bill Mok and Hong Zheng</td>
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<tr>
<td>Slope reliability analysis using a non-intrusive stochastic finite element method&lt;br&gt;S.H. Jiang &amp; D.Q. Li</td>
<td>Reliability of heterogeneous slopes with cross-correlated shear strength parameters&lt;br&gt;T.M.H. Le</td>
<td>Ultrasound as a new approach for the prediction of collapsible soils&lt;br&gt;K. Abbeche &amp; M.S. Laouar Mohamed Salah</td>
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<tr>
<td>Study on cracking risk of Jinping high and steep slope&lt;br&gt;P. Lin &amp; X.L. Liu</td>
<td>Stochastic finite element analysis for ground improvement by vertical drains of spatially variable soils&lt;br&gt;M. Wasiul Bari, M.A. Shams &amp; M.A. Shahn</td>
<td>Reliability Analysis of Dam Erodibility&lt;br&gt;C.M. Mok, E.S. Au, R. Wright &amp; J. Cooley</td>
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<td>Mechanism and numerical simulation on geological mechanical model test&lt;br&gt;X.Q. Luo, J.F. Bi &amp; H. Shen</td>
<td>Regularity of the variance reduction function in Tianjin Port&lt;br&gt;S.W. Yan, L.P. Guo &amp; Y.H. Cao</td>
<td>Introducing non-stationary earthquake process concept: including an analytical model and a case study in Central Taiwan&lt;br&gt;Y. Xu &amp; J.P. Wang</td>
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Parallel Sessions: 6 December 2013, 13:10 - 14:40

Session A-3  IAS Theatre
Risk management in geotechnical engineering and construction projects
Co-Chairs: Martin van Staveren and Ken Ho

indicator kriging for locating risk zones: an application to buildings at risk in the Barcelonnette Basin

Development of a probabilistic model for the prediction of building damage due to tunneling induced settlements
Carles Camós, Climent Molins, Olga Špacková & Daniel Straub

A three-level framework for multi-risk assessment
Z.Q. Liu & F. Nadim

Rockfall risk management based on survey data of real slopes
S. Moriguchi, Y. Otake, M. Iwata, Y. Honjo, A. Takagi, F. Kurauchi, T. Hara, K. Sawada, A. Yashima & N. Asano

Implementing geo risk management in a client organization
M. Th. van Staveren, P.P.T Litjens & J.J. Heerema

Implementing geo risk management in the construction industry
M. Th. van Staveren, P.P.T Litjens & P.M.C.B.M. Cools

Session B-3  IAS Seminar Room 1
Reliability and risk analysis (I)
Co-Chairs: Jianye Ching and Xu Li

The schedule optimization for subway station construction based on critical chain

A cell-based model for predicting runout distances of detached materials in rainfall-induced slope failures
H.X. Chen & L.M. Zhang

Dike failure mechanisms from the perspective of risk assessment
J. Danka & L.M. Zhang

Seismic damage occurrence probability in an existing estuary dam
T. Hara, M. Iwata, Y. Otake, Y. Honjo, T. Kato, A. Nishida & H. Yukimoto

Probabilistic analysis of dry soil mix columns
J. Huang, R. Kelly & S.W. Sloan

Soft soil subgrade’s reliability and risk assessment under incomplete probability conditions
C. Liu & M. Zhao
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<td>Reliability and risk analysis (II)</td>
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<tr>
<td>Co-Chairs: Sam Paikowsky and Jinhui Li</td>
<td>Co-Chairs: Lulu Zhang and Don Wang</td>
</tr>
<tr>
<td>Serviceability limit state design of lime-cement columns – a reliability-based design approach</td>
<td>Linear regression and statistical analysis of shear strength parameters</td>
</tr>
<tr>
<td>N. Bergman, R. Ignat &amp; S. Larsson</td>
<td>X. Li, L.H. Chen &amp; N. Zhang</td>
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<tr>
<td>Cost-effective framework for simplified geotechnical reliability-based design</td>
<td>Reliability analysis of 20-km river dike against liquefaction failure</td>
</tr>
<tr>
<td>J.Y. Ching &amp; K.K. Phoon</td>
<td>Yu Otake, Yusuke Honjo &amp; Yuichi Hiramatsu</td>
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<td>Reliability index of pile foundations designed to SANS 1016-5</td>
<td>Uplift model for the Red River dikes of Vietnam</td>
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<td>M. Dithinde &amp; J.V. Retief</td>
<td>P.Q. Tu, B.V. Truong &amp; P.H.A.J.M van Gelder</td>
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<td>Codified reliability-based design of shallow foundations in Shanghai</td>
<td>The buildup and assessment of environmental indices for storm induced disaster prone areas</td>
</tr>
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<td>Development and reliability of a pile driving formula for the MnDOT</td>
<td>Effect of rainfall on the reliability of an infinite slope</td>
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<tr>
<td>S.G. Paikowsky, C.M. Marchionda, S. Amatya, M.C. Canniff &amp; A.S. Budge</td>
<td>J. Yuan, I. Papaioannou, C.M. Mok &amp; D. Straub</td>
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<td>On the validation of reliability and partial safety factors for axially loaded piles in dense sand</td>
<td>Influence of particle transport on slope stability under rainfall infiltration</td>
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<td>L. Zhang &amp; L.L. Zhang</td>
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| Reliability-based design and limit state design in geotechnical engineering (II)  
Co-Chairs: Armin Stuedlein and Yu Wang | Geotechnical applications and case studies  
Co-Chairs: Hongwei Huang and Zijun Cao |
| Reliability assessment of earth pressure on rigid non-yielding retaining walls  
S.M. Dasaka, T.N. Dave & V.K. Gade | Effect of riverbed scouring on bridge piles during earthquake  
Z.H. Khan, M.R.I. Khan, M.F. Raiyan & K.M. Amanat |
| Localised metamodelling techniques for geotechnical reliability-based analysis  
S.H. Marques, A.T. Gomes & A.A. Henriques | Site investigation approaches for the proposed Ukhun Khudag to Gashuun Sukhait Railway, South Gobi desert, Mongolia  
A.D. Mackay & N.R. Wightman |
| Effect of slenderness ratio on the reliability-based serviceability limit state design of augered cast-in-place piles  
S.C. Reddy & A.W. Stuedlein | Ground anchor considerations for crane footings adjacent deep rock excavations  
N.R. Wightman & A.D. Mackay |
| Reliability-based evaluation of vertical bearing capacity of piles using FORM and MCS  
A. Teixeira, A. Gomes Correia & A.A. Henriques | Risk minimization by an adapted dewatering scheme at the construction of the new ship lock in Minden  
H. Montenegro, B. Odenwald & R. Kauther |
| Reliability-based design for the serviceability state design of an excavation with cross walls in clays  
S.H. Wu, J. Ching & C.Y. Ou | The impact of geometry bedding toward slope stability in coal mining  
Supandi, ST, MT. & H. Hidayat, ST |
| Risk identification and mitigation for construction of a subway transfer station in Beijing  
H. Wang, Z. Wu & D. Wang |  |
Walking Routes from Bus Stations to Institute for Advanced Study
Map of HKUST Campus

Conference venue