

## Minutes for 32<sup>nd</sup> ISSMGE TC304 Meeting (Email meeting)

**Date:** Mar 25-29, 2019

**Time:** 9:00 am Mar 25 to 5:00 pm March 29 (Taipei, UTC/GMT +8 hours)

### 1. Approval of the 31st TC304 minutes (Email meeting)

Minutes were approved.

### 2. TC304 task forces & working groups

TC304 databases (304dB) <http://140.112.12.21/issmge/tc304.htm?=6>

- Liquefaction databases (LiqChina) (Leader: Yanguo Zhou; Members: Xiao-jun Li, Su Chen, Xiao-Ming Yuan, Long-Wei Chen, Lan-Min Wang, Lin Dong, Li-Hua Tang, Shuai Li, Guo-Jun Cai, Jie Zhang, Wen-Ping Gong & Chih-Sheng Ku)
  - Will be finalized in July
- New database provided by Shinichi Nishimura will be uploaded to the 304dB website in several weeks (Armin)
- Usage report for 304dB: It is important to trace the actual usage of the TC304dB. Please list your works below if you have utilized 304dB and acknowledged the TC304 and the database owners in them.

Database	Work title	Acknowledge 304dB and database owners?
CLAY/10/7490 S-CLAY/7/168	Ching, J. and Phoon, K.K. (2018). Constructing site-specific probabilistic transformation model by Bayesian machine learning. ASCE Journal of Engineering Mechanics (in press)	304dB is acknowledged
CLAY/10/7490	Ching, J. and Phoon, K.K. (2018). Constructing site-specific multivariate probability distribution model – incorporation of spatial correlation. ASCE Journal of Engineering Mechanics (in review)	304dB is acknowledged
CLAY/10/7490	Ching, J. and Phoon, K.K. (2018). Measuring similarity between site-specific data and records in a geotechnical database. ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering (in review)	304dB is acknowledged
A-CPT/232/2500m <sup>2</sup> SC-CPTU/25/78m <sup>2</sup>	Ching, J., Phoon, K.K., Stuedlein, A.W., and Jaksa, M. (2018). Identification of sample path smoothness in soil spatial variability. Structural Safety (in review)	304dB is acknowledged
CLAY/10/7490	Sin-Chi Kuok and Ka-Veng Yuen (2018). Clay properties correlation prediction using broad learning. To be submitted to a special collection for the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering (under preparation)	Will acknowledge
A-CPT/232/2500m <sup>2</sup>	Wang, Y., Guan, Z., and Zhao, T. (2018). "Sample size determination in geotechnical site investigation considering spatial variation and correlation." Canadian	304dB is acknowledged

	Geotechnical Journal, <a href="https://doi.org/10.1139/cgj-2018-0474">https://doi.org/10.1139/cgj-2018-0474</a> .	
A-CPT/232/2500m <sup>2</sup>	Wang, Y., Zhao, T., and Phoon, K. K. (2019). "Statistical inference of random field auto-correlation structure from multiple sets of incomplete and sparse measurements using Bayesian compressive sampling-based bootstrapping." <i>Mechanical Systems and Signal Processing</i> , 124, 217-236.	304dB is acknowledged

### 3. Activities in the past six months (conferences, short courses, awards, and keynotes)

#### 3.1 Conferences & workshops

- 3rd International Workshop on Resiliency of Urban Tunnels and Pipelines, October 1 2018, Hannover, Germany (Michael Beer, Hongwei Huang & Bilal Ayyub)
  - Six keynotes
- Workshop on Reliability Based Design, Risk Analysis, Limit State Design, Dec 7 2018, Hong Kong (Geotechnical Division of the Hong Kong Institution of Engineers)
  - Invited speakers: KK Phoon & J Ching

#### 3.2 Short courses

- "Statistical estimation of soil properties" (KK Phoon & J Ching), June 1 2018, 6ISRERM, Singapore
- "Use of Bayesian statistical methods in geotechnical engineering" (Jinsong Huang), July 31 2018, Sydney, Australia
- "Probabilistic methods in geotechnical engineering" (DV Griffiths), August 6 2018, Sydney, Australia
- "Quantitative risk assessment in geotechnical engineering" (DV Griffiths), NZGS. May 28 2018, Wellington, NZ; NZGS; June 5 2018, Christchurch, NZ; CGSE; August 6 2018, UTS Sydney, Australia.
- "Limit states design" (probabilistic aspects) (Dennis Becker & Gordon Fenton), Sep 23 2018, Geo-Edmonton, Edmonton, Alberta, Canada
- "Quantitative risk assessment in geotechnical engineering" and RFEM Workshop (DV Griffiths), Escuela Ingenieria de Colombia. October 12-13 2018, Bogota, Colombia.
- "Reliability and risk analysis in geotechnical practice" (in Dutch) (Wim Kanning and Timo Schweckendiek) for 20 Dutch practicing engineers, October 7-8 2018, The Netherlands
- "Quantitative risk assessment in geotechnical engineering" and RFEM Workshop (DV Griffiths), Escuela Ingenieria de Colombia. October 12-13 2018, Bogota, Colombia.
- "Probabilistic methods in geotechnical engineering" and RFEM Workshop (DV Griffiths), 1-5 days for a major geotechnical consultancy. December 11-12 2018, Sydney, Australia.
- "Uncertainty and Reliability in Engineering" (Iason Papaioannou & Daniel Straub), March 11-12 2019, Munich, Germany

#### 3.3 Awards

- Georisk 2017 Best Paper Award
  - Te Xiao, Dian-Qing Li, Zi-Jun Cao and Xiao-Song Tang, Full probabilistic design of slopes in spatially variable soils using simplified reliability analysis method, *Georisk*, 2017, 11(1), 146-159.
- Georisk 2017 Most Cited Paper Award
  - Lloret-Cabot, G.A. Fenton, and M.A. Hicks, On the estimation of scale of fluctuation in geostatistics, *Georisk*, 2014, 8(2), 129-140.
- Canadian Geotechnical Journal "Editor's Choice" award

- Naghibi, F., and Fenton, G.A., Target geotechnical reliability for redundant foundation systems, Canadian Geotechnical Journal, 2017, 54(7), 945-952,

### 3.4 Keynotes

- Special lecture “Optimising Site Investigations Using a Risk-based Approach” (Mark Jaksa), May 8-9 2018, Australian Geomechanics Society, Tasmanian and Victorian Chapters.
- Keynote lecture “Bayesian data mining for a generic geotechnical database” (J Ching & KK Phoon), 6ISRERM, May 31-June 1 2018, Singapore
- Plenary lecture “Smart sensing on tunnel defects by artificial intelligence” (HW Huang), 6ISRERM, May 31-June 1 2018, Singapore
- Keynote lecture “Smart Sensing on Infrastructure Safety by WSN” (Hongwei Huang), 5th Joint Workshop on Building / Civil Engineering between Tongji & Tokyo Tech, July 26-27 2018, Tokyo, Japan
- Keynote lecture “Individual and regional risk assessments of landslides” (Jinsong Huang), Australian Geoscience Council Convention, October 14-18 2018, Adelaide, Australia
- Round table lecture on "Lessons from the past and perspectives for the future of Geotechnical Engineering" (Waldemar Hachich), GEOJOVEM 2018, August 28 2018-September 1 2018, Salvador, Bahia, Brazil.
- Special lecture on "Reliability of soil nailing structures" (Waldemar Hachich), COBRAMSEG 2018, August 28 2018-September 1 2018, Salvador, Bahia, Brazil.
- Keynote lecture “Robust Design and Maintenance in Geostructural System” (Hongwei Huang), 3rd International Workshop on Resiliency of Urban Tunnels and Pipelines, October 1 2018, Hannover, Germany
- Keynote on "Risk Assessment and Civil Infrastructure" (DV Griffiths), EXPOingenieria World Congress, Medellin, Colombia.
- Keynote lecture “Individual and regional risk assessments of landslides” (Jinsong Huang), Australian Geoscience Council Convention, October 14-18 2018, Adelaide, Australia
- Panelist and main workshop speaker on "The Role of Water and Climate Change in Geotechnical Risk" (DV Griffiths), CARE2018 Conference, October 26-28 2018, Hong Kong
- Keynote lecture “Robust Design and Maintenance in Geostructural System” (Hongwei Huang), 3rd International Workshop on Resiliency of Urban Tunnels and Pipelines, October 1 2018, Hannover, Germany
- Keynote lecture “Smart Sensing on Metro Tunnel Safety by WSN” (Hongwei Huang), 2nd International Metrorail Forum Turkey, October 4-5 2018, Istanbul, Turkey
- Keynote on "Risk Assessment and Civil Infrastructure" (DV Griffiths), EXPOingenieria World Congress, Medellin, Colombia.
- Keynote lecture “Smart Sensing on Metro Tunnel Safety by WSN” (Hongwei Huang), 2nd International Metrorail Forum Turkey, October 4-5 2018, Istanbul, Turkey
- Panelist and main workshop speaker on "The Role of Water and Climate Change in Geotechnical Risk" (DV Griffiths), CARE2018 Conference, October 26-28 2018, Hong Kong
- 10th Lumb Lecture on “The Story of Statistics in Geotechnical Engineering” (KK Phoon), University of Hong Kong, December 6 2018, Hong Kong, China

### 3.5 Books

- The 5th edition of the textbook "Programming the Finite Element Method" by Smith, Griffiths and Margetts, John Wiley & Sons, has recently been published in the Chinese language (2017): <http://product.dangdang.com/25083010.html>

## 4 Future activities

### 4.1 Conferences & workshops

- Workshop on advanced numerical simulation methods for geotechnical problems involving large deformation, May 24-25 2019, Tongji University, Shanghai, China (Hongwei Huang & Mingliang Zhou)
- 13<sup>th</sup> International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP13), May 26-30 2019, Seoul, Korea, 2019 (Chair: Junho Song)
  - <https://www.icasp13.snu.ac.kr/>
  - TC304 special session on “Development and Application of Probabilistic Methods in Geotechnical Engineering” (Yu Wang, Jie Zhang & J Ching)
    - 9 full papers accepted, two sessions
  - TC304 meeting
  - Keynotes: Daniel Straub and KK Phoon
- Kid's Science Day on Urban Hazards and Mitigation, June 29 2019, Tongji University, China (HW Huang & Jie Zhang)
- 2nd International Workshop on Machine Learning and Big Data in Geoscience, June 30-July 2 2019, Shanghai, China (HW Huang, Zhongqiang & Dongming Zhang)
- 29th European Safety and Reliability Conference (ESREL 2019), September 22-26 2019, Hannover, Germany, (Michael Beer & Enrico Zio)
  - <https://esrel2019.org/#/>
  - TC304 session (Jianye)
    - 10 abstracts
  - TC304/TC309 Student Contest (Giovanna & Wojciech Puła)
    - 35 groups of students have applied for participation
  - Keynote: KK Phoon
  - Possible TC304 meeting
- 16th Asian Regional Conference (16ARC) on Soil Mechanics and Geotechnical Engineering, October 14-18 2019, Taipei, Taiwan
  - <http://www.16arc.org>
  - TC304 session on “Geotechnical risk/reliability and data analysis” (JP Wang & J Ching)
    - 7 papers were received.
  - Short course (KK Phoon & J Ching)
  - Keynote (J Ching & KK Phoon)
- International Symposium for Geotechnical Safety & Risk (ISGSR 2019), December 11-13 2019, Taipei, Taiwan (Chair: J Ching; Vice Chair: Dianqing; Secretary: Jie Zhang)
  - <http://www.isgsr2019.org/>
  - 144 full papers have been received
  - Named lectures
    - Wilson Tang Lecture: Hsein Juang
    - Suzanne Lacasse Lecture: KK Phoon
  - Keynotes
    - John Harrison, Jinsong Huang, Karen Knight, Trevor Orr, Yu Wang, and Limin Zhang
  - Short courses
    - Risk Assessment in Geotechnical Engineering (DV Griffiths & Gordon Fenton)
    - Bayesian method and tools for geotechnical practice (Timo Schweckendiek & Yu Wang)
    - Geotechnical reliability-based design examples to improve partial factor design methods (BK Low & KK Phoon)
  - Mini-symposiums
    - TC309/304 mini-symposium on Machine Learning and Big Data for Geotechnics (Zhongqiang & Zijun)

- Mini-symposium on Performance-based Design Codes and Practice honoring Prof. Yusuke Honjo (Takashi Hara and Yu Otake)
    - Special session honoring late Prof. Tien H. Wu (KK Phoon and Hsein Juang)
  - Sessions
    - Advances in geotechnical reliability-based design (Zijun Cao & Dianqing Li)
    - Bayesian method for processing geotechnical data (Shadi Najjar)
    - Bayesian updating: Formalizing the observational method (Iason Papaioannou, Johan Spross & Daniel Straub)
    - Dams, levees and flood risk (Wim Kanning & Bryant A. Robbins)
    - Effect of spatial variability on seismic performance of soil and rock and associated reliability (Armin W. Stuedlein & Taeho Bong)
    - Engineering risk sensing by monitoring and inspection (Hongwei Huang & Shinichi Akutagawa)
    - Inverse analysis in geotechnical engineering (Shin-ichi Nishimura)
    - Landslide risk assessment and management (Limin Zhang)
    - Modelling spatial variability in geotechnical engineering (Jinsong Huang & DV Griffiths)
    - Numerical techniques for integrating the spatial variability of soil and groundwater parameters into designing and environmental management (Giovanna Vessia, Diego Di Curzio & Wojciech Pula)
    - Probabilistic seismic hazard assessment and engineering seismology (JP Wang)
    - Probabilistic site characterization (Yu Wang & Zijun Cao)
    - Risk assessment of rainfall-induced geo-hazards (Lulu Zhang & Hong-Xing Chen)
    - Robust geotechnical design in the face of uncertainty (Wenping Gong, Lei Wang & Mengfeng Shen)
    - Statistics for soil & rock properties and applications (KK Phoon & Marco Uzielli)
    - Uncertainty & reliability analysis in rock engineering (Rafael Jimenez)
    - Case histories / applications (Armin Stuedlein & Jianye)
  - TC304/TC309 Student Contest
- 6th International Conference on Geotechnical and Geophysical Site Characterization (ISC'6), September 7-11 2020, Budapest, Hungary
  - <http://www.isc6.org/>
  - Abstract deadline March 31 2019
  - Possible TC304 session
  - Possible TC304/TC309 meeting
- 7<sup>th</sup> Asian-Pacific Symposium on Structural Reliability and its Applications (APSSRA7), October 4-7 2020, Tokyo (Ikumasa Yoshida & Shin-ichi Nishimura)
  - Theme: From Reliability to Risk, from Academia to Society
  - Important Dates
    - Nov 2019 Abstract submission due
    - Apr 2020 Full paper submission due
    - Jun 2020 Notification of acceptance
  - Correspondence
    - Symposium Chair: Tsuyoshi Takada, The University of Tokyo, Japan
    - Secretariat: Tatsuya Itoi, The University of Tokyo, Japan
    - email: [apssra2020@load.arch.t.u-tokyo.ac.jp](mailto:apssra2020@load.arch.t.u-tokyo.ac.jp)
  - TC304 Suzanne Lacasse Lecture
  - TC304 mini-symposium
  - TC304/TC309 Student Contest

- Keynote: J Ching
- 6th Int. Conf. on Geotechnical and Geophysical Site Characterization (ISC'6), September 7-11 2020, Budapest, Hungary
  - TC304 is organizing a special session together with TC309 on "Probabilistic site characterization and data analytics"
  - The topics relevant to this session include, but are not limited to the following:
    - Soil/rock databases
    - Statistical characterization of soil/rock data
    - Correlations and transformation models
    - Characterization of spatial variability
    - Statistical uncertainty in site characterization
    - Machine learning methods
    - Bayesian approaches
    - Impact on reliability-based design
  - If you are keen to submit abstracts to this conference, please submit through the conference website (<http://www.isc6.org/>), preferably by March 31, and also send a copy to Jianye Ching ([jyching@gmail.com](mailto:jyching@gmail.com)).
- Black-box reliability challenge 2019, Department of Structural Reliability, TNO
  - Information provided by Timo Schweckendiek
  - <https://rprepo.readthedocs.io/en/latest/introduction.html>
  - Everyone is welcome to join the challenge (registration will open in early 2019). The participants use their computer and their selected method to solve reliability problems with performance functions located on the organizers servers.
  - Important dates
    - December 21 2018: Announcement & test problems
    - March 28 2019-October 31 2019: Challenge
    - December 1 2019: Announcement of results
- 18th Nordic Geotechnical Meeting (NGM2020) & 14th Baltic Sea Geotechnical Conference (BSGC2020), May 25-27 2020, Helsinki, Finland
  - Session on "Statistical Methods and reliability based Design" (Korkiala-Tanttu Leena)
  - <https://www.ril.fi/en/events/ngm-2020.html>
  - <https://www.ril.fi/en/events/bsgc-2020.html>

#### 4.2 Short courses

- Statistical Estimation of Soil Properties (KK Phoon & J Ching), April 2 2019, Chung Yuan Christian University, Taoyuan, Taiwan
- Summer school for inverse problems in Civil Engineering: Bayes' Theorem and Sparse Modeling (Shinichi Nishimura), September 1 -2 2019, Okayama, Japan
- Modeling and Numerical Methods for Uncertainty Quantification (Jean-Marc Bourine & Carsten Proppe), September 2-6 2019, Porquerolles, France
  - <https://www.sigma-clermont.fr/en/mnmuq2019>
  - Jason is one of the lecturers in this short course
- Geostatistics applied to environmental variables (Annamaria Castrignanò), July 1-5 2019, University of Chieti; Advanced Geostatistics (non-stationary methods, co-kriging, stochastic simulations, etc.) (Annamaria Castrignanò), Sept 30 to Oct4 2019, University of Chieti, Italy
  - The above two short courses are organized by Giovanna Vessia
  - Devoted to PhD students and professionals as geologists and geotechnical engineers

- Statistical Estimation of Soil Properties (KK Phoon & J Ching), 16 ARC, October 14-18 2019, Taipei, Taiwan
- Reliability and Risk in Geotechnical Engineering Practice (Timo Schweckendiek & Wim Kanning), 13-14 November 2019, Delft, The Netherlands
  - <https://www.deltares.nl/en/academy/reliability-and-risk-in-geotechnical-engineering-practice/>
  - This will be the third edition of the course. Expect to introducing more practicing engineers to the potential of risk and reliability methods for enriching their skills on risk-based site investigation, reliability-based assessment of existing geotechnical structures, design optimization and alike.
- Risk Assessment in Geotechnical Engineering (DV Griffiths & Gordon Fenton), Bayesian method and tools for geotechnical practice (Timo Schweckendiek & Yu Wang), Geotechnical reliability-based design examples to improve partial factor design methods (BK Low & KK Phoon), ISGSR 2019, December 11-13 2019, Taipei, Taiwan

#### 4.3 Books/journals/special issues

- Special Collection of the ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems: Part A on “Bayesian Learning Methods for Geotechnical Data” (Kelvin Yuen, J Ching & KK Phoon)
  - 7 contributions
- Georisk Special issue on “Recent Developments of Performance-based Design Codes and Practice” honoring Prof Yusuke Honjo (Takashi Hara and Yu Otake)
  - Update by Takashi (9 papers received)
- Special issue in Biosystems Engineering on "Computational Tools to Support Soil Management Decisions" (Editors: Vessia G., Falconer R., Zimmermann B. & Tarquis A. M.)
  - Volume 168, Pages 1-142 (April 2018)
  - 11 contributions
- Georisk review paper for Machine Learning is finalized for publication: Machine learning in georisk: from geohazards to structural safety (Kelvin Yuen & He-Qing Mu)
  - The paper is being finalized and will be submitted for review shortly (He-qing Mu).
- Georisk Special issue honoring late Prof. Tien H. Wu (KK Phoon and Hsein Juang)
  - 12 papers are submitted

#### 4.4 Keynotes

- Waldemar Hachich was elected by the Brazilian Geotechnical Association (ABMS) to deliver the prestigious Milton Vargas Lecture for 2018 at twelve different venues around the country
- (16 ARC) Keynote by J Ching & KK Phoon
- (ISGSR 2019) Wilson Tang Lecture by Hsein Juang, Suzanne Lacasse Lecture by KK Phoon, keynotes by John Harrison, Limin Zhang, Trevor Orr, Jinsong Huang, and Yu Wang

### 5 Other businesses

- TC304 Young Group (Andy Leung, Zijun Cao & Lei Wang)
  - Short videos
    - The "short video" (SV) activity is organized by TC304 Young Group (Andy Leung, Zijun Cao & Lei Wang) to address “ISSMGE virtual university” proposed by President Charles NG. Target audience would be practicing engineers and students.
    - Young Group has set six topics for short videos (about 15 min each) introducing different aspects of geotechnical risk and reliability.
      - SV1: Overview and significance of geotechnical uncertainty

- SV2: How to characterize site/model uncertainty
- SV3: How to estimate characteristic values for design
- SV4: How does geotechnical uncertainty impact the system response
- SV5: How to perform reliability analyses on a spreadsheet
- SV6: Case studies for reliability-based design and risk assessment
- Yu Wang and Zijun Cao are working on the recording of webinars to iron out potential technical issues with the recording. If you are keen to contribute to the short videos, please contact Jianye at [jyching@gmail.com](mailto:jyching@gmail.com).
- TC304/TC309 Student Contest
  - The 2nd student contest on 'Spatial Data Analysis Applied to 304dB' will be held at European Safety and Reliability (ESREL) Conference in Hannover, Sep 2019.
  - The 3rd student contest will be held at ISGSR2019 at Taipei. Young Group is starting to draft the contest question, which is expected to be finalized by end of April.