ISGSR 2022

8th International Symposium for Geotechnical Safety & Risk

14 - 16 December 2022 - Newcastle, Australia

Priority Research Centre for
CGSE
Geotechnical Science & Engineering
The University of Newcastle

geotechnical safety network

SIMSG | ISSMGE
TC304 (Engineering Practice of Risk Assessment and Management) & TC205 (Safety and Serviceability in Geotechnical Design), ISSMGE

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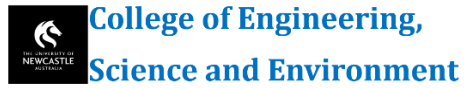
Program

Wednesday, 14 December 2022 (Short Courses)

13:30-18:00	**Registration** *Room: X101*
09:00-12:15	"Quantitative Risk Assessment in Geotechnical Engineering" **Prof. D.V. Griffiths, Colorado School of Mines** *Room: X204*
12:15-13:30	Lunch
13:30-16:45	"Quantitative Risk Assessment in Geotechnical Engineering" **Prof. D.V. Griffiths, Colorado School of Mines** *Room: X204*
17:00-18:00	**GEOSNet Board Meeting** *Room: X205*
18:00-20:00	**Reception (Beverage & Canape), Foyer, Nuspace**

Thursday, 15 December 2022

08:00-18:00	**Registration** *Room: X101*				
08:30-09:00	**Opening Ceremony** *Room: X101*				
09:00-09:40	**Wilson Tang Lecture** – "Geotechnical Probability: From FOSM to RFEM" **Prof. D. V. Griffiths, Colorado School of Mines, USA** Chair: Mark Jaksa *Room: X101*				
09:40-10:10	**Keynote** – ''Applications of Artificial Intelligence in Geotechnical Engineering'' **Prof. Mark Jaksa, University of Adelaide, Australia** Chair: D. V. Griffiths *Room: X101*				
10:10-10:30	**Tea Break (Photo-taking)**				
Sessions	**(IS3) Modelling spatial variability in geotechnical engineering** Chairs: Jinsong Huang, D.V. Griffiths, Shuihua Jiang *Room: X101*	**(IS5) Geological uncertainties in geotechnical analysis and design** Chairs: C. Hsein Juang, Jia-Jyun Dong & Wenping Gong *Room: X204*	**(IS11) Landslide Risk Assessment & Geo-Hazards Induced by Rainfall, Earthquake and Other Factors** Chairs: Limin Zhang & Wengang Zhang *Room: X205*	**(IS6) Advances of Theory, Methodology and Applications in Geotechnical Reliability-based Design** Chairs: Zijun Cao, Jian Ji & Dian-Qing Li *Room: X207*	**(IS2) Data Driven Site Characterization Methods and Their Benchmarking** Chairs: Takayuki Shuku & KK Phoon *Room: X208*
10:30–10:45	(IS3-21) Reliability Analysis of a Shallow Foundation Considering Soil Spatial Variability *A.T. Siacara, H.M. Kroetz, A.T. Beck, and M.M. Futai*	(IS5-14) Geological Uncertainty Quantification Using Image Warping and Bayesian Machine Learning *Hui Wang and Xingxing Wei*	(IS11-01) Uncertainty Quantification of Landslide Susceptibility Mapping Considering Landslide Boundary Geometry *Sahand Khabiri and Yichuan Zhu*	(IS6-01) Reliability Analysis of Width-Constrained Piled Slopes Considering Three-Dimensional Spatial Variability of Soil Strength *Zhibin Sun, Hao Zhuang, Daniel Dias, and Tingting Zhang*	(IS2-03) Benchmarking Study of Three-Dimensional Subsurface Modelling Using Bayesian Compressive Sampling/Sensing *Borui Lyu, Yue Hu, and Yu Wang*
10:45-11:00	(IS3-03) Locally Connected Neural Networks as Surrogate Models for Stochastic Analysis with Spatial Variability *Xuzhen He, Fang Wang, and Daichao Sheng*	(IS5-01) Design of Rock Socketed Piles in Complex Geological Environments: Two Case Studies from Central and North Queensland *Katherine Farry, Natasha Joynson, and Sharath Kudumula*	(IS11-02) Contribution on Debris Flow Forecast *Danúbia Teixeira Silva and Anna Laura Lopes da Silva Nunes*	(IS6-02) Reliability-Based Design Optimization of Pile Stabilized Earth Slopes Aided by Pareto Optimality *Yining Hu and Jian Ji*	(IS2-01) Comparison of Data-Driven Site Characterization Methods through Benchmarking: Methodological and Application Aspects *Takayuki Shuku and Kok Kwang Phoon*

11:00-11:15	(IS3-05) Effect of Spatial Variability in Asphalt Layer on Critical Pavement Response *Li Xiao and Jianfeng Xue*	(IS5-02) The Application of the RMEI Scour Assessment for a Heterogeneous Rockmass in an Unlined Spillway Channel *Juan Michelangeli and Graeme Jardine*	(IS11-05) Risk Evaluation for Earth-Fill Dams by Response Surface Method *Shiying Zheng, Shin-Ichi Nishimura, and Toshifumi Shibata*	(IS6-03) Multi-Objective Inverse Reliability Design Approach in Geotechnical Engineering *Jian Ji, Zhe-Ming Zhang, and Zhao-Cheng Wang*	(IS2-08) A Method for Probabilistic Assessment of Slope Bearing Capacity Considering Stratigraphic Uncertainty *Hui Wang and Zehang Qian*
11:15-11:30	(IS3-06) Efficient Reliability Analysis of Slopes in Spatially Variable Soils Based on Active-Learning Multivariate Adaptive Regression Spline *Zhi-Ping Deng, Min Zhong, Min Pan, Jing-Tai Niu, and Ke-Hong Zheng*	(IS5-03) Machine Learning of Subsurface Geological Model for Assessment of Reclamation Induced Consolidation Settlement *Chao Shi and Yu Wang*	(IS11-11) Catastrophic Landslide Triggered by Extreme Rainfall in Chongqing, China: July 13, 2020, Niuerwan Landslide *Chang Zhou and Wei Huang*	(IS6-04) System Reliability Analysis of Unsaturated Soil Slopes under Rainfall: Rotational or Translational Failure? *Wen-Wang Liao, Wen-Gui Huang, and Jian Ji*	(IS2-02) Comparative Study of Kriging-Based Geostatistical Models for Probabilistic Site Characterization Using Benchmarking Examples *Cong Miao, Zi-Jun Cao, Chang Tang, and Te Xiao*
11:30-11:45	(IS3-07) Field Measurements-Based Probabilistic Stability Analysis of an Earth Dam *Xiangfeng Guo, Daniel Dias, Claudio Carvajal, Laurent Peyras, and Pierre Breul*	(IS5-04) Uncertainty Estimation of P Wave Velocity and Layer Boundaries Using Seismic Refraction with Synthetic Horizontal Layered Geological Model *Danastri LP Tampubolon, Zhuo- Kang Guan, Kuo- Chen Hao, Jia- Jyun Dong, and Chia- Huei Tu*	(IS11-13) Assessment of Wall Deflection Induced by Braced Excavation in Spatially Variable Soils via Convolutional Neural Network *Chongzhi Wu and Wengang Zhang*	(IS6-07) Seismic Performance Analysis and Anti-seismic Measures for High Concrete Face Rockfill Dam Based on Stochastic Dynamic Theory *Zhuo Rong, Rui Pang, and Bin Xu*	(IS2-05) Application of Gaussian Process Regression Using Multiple Random Fields to Benchmarking Data *Yukihisa Tomizawa and Ikumasa Yoshida*
11:45-12:00	(IS3-09) Application of Image Segmentation for Predicting Slope Failure Mechanism in Spatially Variable Soils *Ze Zhou Wang, Jinzhang Zhang, Siang Huat Goh, and Hongwei Huang*	(IS5-05) Investigation of Complex Ground Conditions at Sydney Park for the Sydney Metro City & Southwest Running Tunnels *M.L. Teoh, S.J. Clarkean, and S. Simmonds*	(IS11-15) Automatic Landslide Inventory Generation Using Deep Learning *Lu-Yu Ju, Te Xiao, and Limin Zhang*	(IS6-10) Evaluation of Traditional Jacked Penetration Model for Offshore Wind Turbine Suction Foundation in Sand *Xingming Zhong, and Peiyuan Lin*	(IS2-06) Gaussian Process Regression and Kernel Selection for Missing Geotechnical Data Prediction *Jiawei Xie, Jinsong Huang, and Cheng Zeng*
12:00-12:15	(IS3-10) Characterization of Vertical Spatial Variability of Soils Using CPTu Data Exploration *Izabela Couto Campello, Maria Das Graças Gardoni, Karla Cristina Araujo Pimentel, and Andre Assis*	(IS5-06) Using Geostatistical Approach to Assess the Hydrogeologial Model Uncertainty on Groundwater Flow and Land Subsidence in Huwei Township, Taiwan *Duc-Huy Tran and Shih-Jung Wang*	(IS11-16) Constructing a Loess Landslide Run-Out Prediction Input Parameter Database through Multi-Objective Optimization Back Analysis *Peng Zeng, Lin Zhang, Liangfu Zhao, Xiaoping Sun, and Xiujun Dong*	(IS6-11) Equivalence between Safety Factor-Based and Reliability-Based Design Requirements for Gravity Retaining Wall Design *Qiang Zhou, Zi-Jun Cao, and Dian-Qing Li*	(IS2-09) Data-Drive Site Characterization for Benchmark Examples Using Sparse Bayesian Learning *Jianye Ching*
12:15-12:30	(IS3-11) Probabilistic Investigation of Infinite Undrained Slopes with Seismic Loading and Linearly Increasing Mean Strength *Desheng Zhu, Lei Xia, D. V. Griffiths, and Gordon A. Fenton*	(IS1-06) Bayesian Subsurface Mapping Using CPT Data *Antonis Mavritsakis, Timo Schweckendiek, Ana Teixeira, and Eleni Smyrniou*	(IS11-17) Introducing a Pattern-Based Approach for Landslide Susceptibility Prediction *Chenxu Su, Cong Dai, Bijiao Wang, Yunhong Lv, and Shuai Zhang*	(IS6-12) An Efficient Adaptive Response Surface Method for Reliability Analysis of Geotechnical Engineering Systems Using Adaptive Bayesian Compressive Sensing and Monte Carlo Simulation (ABCS-MCS) *Peiping Li and Yu Wang*	
12:30-13:40	Lunch				

Time					
13:40-14:10	**Keynote** – ''Global, Regional, or Municipal Database? Which Is Better?'' **Prof. Jianye Ching, National Taiwan University, Taiwan** Chair: Michael Hicks *Room: X101*				
14:10-14:40	**Keynote** – ''Recent Advances on Uncertainties and Solutions for a Reliable and Effective Prediction of Rockfall Hazard and Risk'' **Prof. Anna Giacomini, University of Newcastle, Australia** Chair: Jinsong Huang *Room: X101*				
Sessions	**(IS12) Uncertainty & Reliability Analysis in Rock Engineering & (IS6) Advances of Theory, Methodology and Applications in Geotechnical Reliability-based Design** Chairs: Anna Giacomini *Room: X101*	**(IS1) Probabilistic site investigation** Chairs: Yu Wang & Jianye Ching *Room: X204*	**(IS8) Machine learning in geotechnical engineering** Chairs: Dongming Zhang, Zhongqiang Liu, Hongwei Huang & Pijush Samui *Room: X205*	**(IS17) Inverse analysis and data assimilation in geotechnical engineering** Chairs: Ikumasa Yoshida, Shin-ichi Nishimura, Yu Otake & Zijun Cao *Room: X207*	**(IS16) Probabilistic Analysis of Seepage and Internal Erosion** Chairs: D.V. Griffiths & Bryant A. Robbins *Room: X208*
14:40-14:55	(IS12-01) Probabilistic Approach for Evaluating Relationship between Rock Drilling Energy and P-Wave Velocity *Takayuki Shuku, Yasuhiro Yokota, Kensuke Date, Masako Ishii, Minato Tobita, Takeru Kumagai, Kazuhiko Masumoto, and Yasuyuki Miyajima*	(IS1-03) Probabilistic Characterization of 3D Non-stationary Spatial Variability from Limited Boreholes Using Bayesian Supervised Learning *Yue Hu and Yu Wang*	(IS8-15) Prediction of Slope Failure through Integrating Statistical Design of Experiments and Artificial Neural Networks *Yuderka Trinidad González, Vernon R. Schaefer, and Derrick K Rollins*	(IS17-02) Hydraulic Conductivity Field Marginalization in HMC Based Estimation of Piping Zone Boundary *Kazunori Fujisawa, Michael C. Koch, Misato Osugi, and Akira Murakami*	(IS16-06) Fragility Curves for Analysis of Levees Subject to Concentrated Leak Erosion *Jonathan Simm, Mohamed Hassan, and Ben Gouldby*
14:55-15:10	(IS12-03) Stability Analysis of Rock Slopes with Stochastic Fractures Using Finite Element Limit Analysis *A.M. Lester, A.V. Lyamin, N.C. Podlich, J. Huang, and A. Giacomini*	(IS1-05) Probability Density Function and Credible Region Estimation for Multivariate Uncertain Irregular Geotechnical Data *Zi-Tong Zhao, He-Qing Mu, and Ka-Veng Yuen*	(IS8-03) Prediction of Parallel Desiccation Cracks of Clays Using a Classification and Regression Tree (CART) Technique *Abolfazl Baghbani, Susanga Costa, Tanveer Choundhury, and Roohollah Shirani Faradonbeh*	(IS17-04) Kriging-Based Conditional Random Field for Regional Liquefaction Potential Mapping Considering Statistical Uncertainty *Cong Miao, Zi-Jun Cao, Chang Tang, and Te Xiao*	(IS16-01) Probabilistic Seepage Analysis of Embankments with Different Types of Random Fields *Fengdong Chi, Pierre Breul, Claudio Carvajal, and Laurent Peyras*
15:10-15:25	(IS12-04) The Impact of Slope Roughness on the Uncertainty in Probabilistic Rockfall Modelling *Indishe Senanayake, Philipp Hartmann, Klaus Thoeni, Abigail Watman, and Anna Giacomini*	(IS1-07) Determination of Optimal CPT Locations for Characterizing Nonstationary Spatial Variability of Geotechnical Properties Using Efficient Bayesian Compressive Sensing *Tengyuan Zhao, Yu Wang, and Ling Xu*	(IS8-04) Development of a Support Vector Machine (SVM) and a Classification and Regression Tree (CART) to Predict the Shear Strength of Sand-Rubber Mixtures *Abolfazl Baghbani, Firas Daghistani, Hossam Abuel Naga, and Susanga Costa*	(IS17-05) Observation Updating of Model Parameters for Consolidation Settlement Using Adaptive Surrogate Model *Tomoka Nakamura and Ikumasa Yoshida*	(IS16-03) Design of a Probabilistic FEM Analysis Using the Sellmeijer Model for Backward Erosion Piping *Ligaya Wopereis, Esther Rosenbrand, Raymond van der Meij, and Willem Kanning*

15:25-15:40	(IS6-16) Stability Design for Spalling Behavior in Deep Hard Rock Tunnel under Uncertainty Using Inverse-Reliability Strategy *Xiang Li, Sen Miao, Bo Yang, and Xibing Li*	(IS1-09) Three-Parameter Lognormal Distribution to Estimate Ultimate Bearing Capacity of Pile Foundations with Extrapolation of Load-Settlement Curves *Naoki Suzuki*	(IS8-11) An Unsupervised Framework for Mud Pumping Detection and Severity Analysis Using In-Service Train Data in Railway Track *Cheng Zeng, Jinsong Huang, and Jiawei Xie*	(IS17-06) Evaluation of Deformation Behavior of a Natural Slope Using Particle Filter *Toshifumi Shibata, Shin-ichi Nishimura, and Takayuki Shuku*	(IS16-01) Probability of Reactivation of a Sand Boil near a River Embankment of the Po River (Italy) *Ilaria Bertolini, Guido Gottardi, Michela Marchi, and Laura Tonni*
15:40-15:55	IS6-08) Probabilistic Slope Stability Assessment with Adaptive Monte Carlo Importance Sampling *Anton van der Meer, Rob Brinkman, and Wim Kanning*	(IS1-10) Probabilistic Experimental Design for Measuring Soil-Water Characteristic Curve Using a Bayesian Approach with One-Stage Optimization *Shao-Lin Ding, Rui Tao, Zi-Jun Cao, and Dian-Qing Li*	(IS8-13) Machine Learning-Based Prediction of Drilling and Blasting Tunnel Initial Support Patterns *Jinghan Chang, Hongwei Huang, Dongming Zhang, Tongjun Yang, and Zhenhua Xing*	(IS17-07) Inverse Process of Multichannel Analysis of Surface Wave by Using Ensemble Kalman Filter *Yuxiang Ren, Shinichi Nishimura, Toshifumi Shibata, and Takayuki Shuku*	(IS16-07) Approach to Estimate the Probability That Internal Erosion Will Initiate a Breach through an Embankment Applied to Levees with an Important Linear and Heterogeneous Facies *Chloé Chancel, Robin Canac, Pierre Alain Rielland, Michel Pinhas, and Akim Salmi*
15:55-16:10		(IS1-04) Bayesian Hierarchical Spatial Modeling of Soil Properties *Iason Papaioannou, Sebastian Geye,r and Daniel Straub*	(IS8-14) High Arch Dam Displacement Prediction Model Based on Long Short-Term Memory Networks with Attention Mechanism *Fei Kang, Ben Huang, Junjie Li, and Sizeng Zhao*	(IS17-08) Linear-System-Type Surrogate Model for Large-Scale Earth-Retaining Work Based on Dynamic Mode Decomposition *Taiga Saito, Shinnosuke Kodama, and Yu Otake*	(IS16-05) Uncertainty in the Critical Secant Gradient Function for Prediction of Backward Erosion Piping *B.A. Robbins and D.V. Griffiths*
16:10-16:30	Tea Break				
Sessions	**(IS4) Reliability assessment of subsoil modelling in geoengineering applications** Chairs: W. Pula, G. Vessia, D. Di Curzio & M. Chwala *Room: X101*	**(IS5) Geological uncertainties in geotechnical analysis and design** Chairs: C. Hsein Juang, Jia-Jyun Dong & Wenping Gong *Room: X204*	**(IS11) Landslide Risk Assessment & Geo-Hazards Induced by Rainfall, Earthquake and Other Factors** Chairs: Limin Zhang & Wengang Zhang *Room: X205*	**(IS10) Application of risk and reliability methods in case studies** Chairs: Andy YF Leung *Room: X207*	**(IS7) Bayesian analysis of geotechnical data & (IS17) Inverse analysis and data assimilation in geotechnical engineering** Chairs: Ikumasa Yoshida, Shin-ichi Nishimura, Yu Otake & Zijun Cao *Room: X208*
16:30-16:45	(IS4-02) Shallow Foundation Settlement Using a Hardening Soil Model for Spatially Variable Soil *Teshager D.K., Chwała M., and Puła W.*	(IS5-16) Investigation of Stratigraphic Uncertainty for Three-Dimensional Geological Modelling *Wei Yan, Wan-Huan Zhou, and Ping Shen*	(IS11-18) Introducing a Pattern-Based Approach for Landslide Susceptibility Prediction *Chenxu Su, Cong Dai, Bijiao Wang, Yunhong Lv, and Shuai Zhang*	(IS10-04) Response Surface Based-Robust Design of Supported Excavation Considering Multiple Failure Modes *Li Hong, Wengang Zhang, and Xiangyu Wang*	(IS7-03) Outlier Detection for Incomplete Multivariate Soil Property Data *Jianye Ching*

Time				
16:45-17:00	(IS4-03) Probabilistic Analysis of an Anchored Diaphragm Wall Installed in Normally Consolidated Sands *Marek Kawa, Wojciech Puła, and Andrzej Truty*	(IS5-13) Regional Reliability Sensitivity Analysis Considering Spatial Variability of Soil *Xiaohui Tan*	(IS11-19) Numerical Evaluation on Seismic Performance of an Integrated Slope Stabilisation System *Yujia Wang, Majidreza Nazem, Annan Zhou, and John V. Smith*	(IS10-05) 3D Underground Stratification Using GLASSO *Kota Kageie and Takayuki Shuku*	(IS7-10) Bayesian Gaussian Mixture Model Learning with Subset Simulation *Guanting Zeng*
17:00-17:15	(IS4-04) Uncertainty Propagation Assessment in CPTu-Based Lithological Modeling Using Stochastic Co-simulation *Diego Di Curzio and Giovanna Vessia*	(IS5-07) Effect of Soil Mechanical Properties on Shield Tunnel Deformation *Yanjie Zhang and Wenping Gong*	(IS11-23) Reliability Analysis of Unsaturated Soil Slope Stability Using Spatial Random Fields-Based Bayesian Method *C. H. Wang, H. D. Du, and S. T. Hu*	(IS10-09) Settlement Prediction of Teven Road Trial Embankment Using Back Analysis Methods *Shan Huang, Jinsong Huang, Richard Kelly, and Ahm Kamruzzaman*	(IS7-07) Bayesian Updating of Slope Reliability under Rainfall Infiltration with Field Observations *Shui-Hua Jiang, Xian Liu, and Iason Papaioannou*
17:15-17:30	(IS4-07) Efficient and Conservative Estimation of Failure Probability of Strip Footing on Spatially Variable Soil Using Random Finite Element Limit Analysis *Wojciech Pula, Hubert Szabowicz, and Marek Kawa*	(IS5-08) Have We Underestimated the Influence of Geological Uncertainty on Tunnel Deformational Performance in the Uncertain Stratum? *Jinzhang Zhang, Dongming Zhang, and Hongwei Huang*	(IS11-06) Deformation Characteristics and Stability of the Sanzhouxi Landslide in the Three Gorges Reservoir *Beibei Yang*	(IS10-02) Some Aspects of the Norwegian Risk Evaluation System for Quick Clay Based on Recent Landslide Events *Amanda DiBiagio, Håkon Heyerdahl, and Ragnar Moholdt*	(IS7-11) Bayesian Emulation of Computer Experiments of Infrastructure Slope Stability Models *Aleksandra Svalova*
17:30-17:45	(IS4-05) Multi-Block Failure Mechanism Approach with Broken Lines in Bearing Capacity Estimation of Spatially Variable Soil *Marcin Chwała and Wengang Zhang*	(IS5-10) The Influence of a Thin Weak Clay Layer on the Close-Ended Pile Behaviors in Sand *Fei Chai, Jianfeng Xue, Fang-Bao Tian, Kevin Duffy, and Ken Gavin*	(IS11-21) Evolution and optimization of stabilizing piles for a reservoir landslide in the Three Gorges Reservoir region, China *Wenmin Yao*	(IS10-06) Mine Subsidence Characterization and Susceptibility Mapping to Guide Risk Mitigation *Sam Mackenzie*	(IS17-01) On the Use of Inverse Analysis for the Estimation of Soil Hydraulic and Retention Parameters from Monitoring Data of a River Embankment *Ilaria Bertolini, Carmine Gerardo Gragnano, and Guido Gottardi*
17:45-18:00		(IS5-12) An Improved Coupled Markov Chain Model for Simulating Geological Uncertainty *Wei Ca and Annan Zhou*	(IS11-22) The Landslide Screening Criteria in Hong Kong Considering Rainfall Intensity and Topography *Liang Gao*	(IS10-08) Reliability of a Soil-Nailed Slope Considering Regional Shear Strength Information *M. K. Lo, Y.F. Leung, C.L. Chan, and E.H.Y. Sze*	(IS17-09) A Comparison between EnKF and MCMC-Based Bayesian Updating for Consolidation Settlement Prediction *Yuanqin Tao, Mengfei Yu, and Honglei Sun*
17:30 – 18:30	**TC304 MEETING (Room X205)**				
18:00 – 19:00	**Moving to Banquet Venue (Q Building, The University of Newcastle, 16B Honeysuckle Dr, Newcastle NSW 2300)**				
19:00	**Banquet & Awards**				

Friday, 16 December 2022

08:30-09:00	**Registration** *Room: X101*				
09:00-09:40	**Suzanne Lacasse Lecture** – **''It Is All about Decisions''** **Prof. Robert B. Gilbert, University of Texas, USA** Chair: Jianye Ching *Room: X101*				
09:40-10:10	**Keynote** – ''Bridging the Gap between Research and Practice'' **Dr. Stephen Buttling, National Geotechnical Consulting, Australia** Chair: Richard Kelly *Room: X101*				
10:10-10:30	**Tea Break**				
Sessions	**(IS20) Risk assessment in offshore geotechnical engineering** Chairs: Jinhui Li & Pan Hu *Room: X101*	**(IS8) Machine learning in geotechnical engineering** Chairs: Dongming Zhang, Zhongqiang Liu, Hongwei Huang & Pijush Samui *Room: X204*	**(IS3) Modelling spatial variability in geotechnical engineering** Chairs: Jinsong Huang, D.V. Griffiths, Shuihua Jiang *Room: X205*	**(IS22) Soil heterogeneity in 3D: characterisation and modelling** Chairs: Yajun Li & Jian Chen *Room: X207*	**(IS21) Risk assessment and reliability based design in geotechnical engineering practice & (IS3) Modelling spatial variability in geotechnical engineering** Chairs: Stephen Buttling & Richard Kelly *Room: X208*
10:30–10:45	(IS20-03) A Probability-Based Upscaling Model of Grading Evolution of Calcareous Sand *Zhao-Feng Li, Fu Liang, and Jin-Hui Li*	(IS8-05) Analysis of Deformation of Segmental Lining during Shield Tunneling Based on Real-Time Monitoring *Jiaqi Chang, Dongming Zhang, and Hongwei Huang*	(IS3-16) The Effectiveness of Spatial Interpolation of Sparse PCPT Data to Optimise Offshore Design *Michael O'Neill, Fraser Bransby, and Phil Watson*	(IS22-01) Three-Dimensional Cross-Correlated Random Field Modelling Based on Hierarchical Archimedean Copulas *Yuan Lu and Jian Chen*	(IS21-01) Geotechnical Risk Management and Contingency Plan for a Sheet Pile Wall Next to an Existing Highway *Henry Zhang and Stephen Li*
10:45-11:00	(IS20-04) A Large Deformation Random Finite-Element Study on the Pull-Out Capacity of Two Typical Offshore Anchors *Shi-Jie Xu, Jiang-Tao Yi, and Jun Hu*	(IS8-06) Optimization of Borehole Location for Site Investigation Based on Coupled Markov Chain *Qihao Jiang, Hua Shao, Jin-Zhang Zhang, Cong Nie, and Dongming Zhang*	(IS3-13) Random Finite Element Analysis for Reliability-Based Assessment of Cement-Treated Soil Columns *Tsutomu Namikawa*	(IS22-04) Influence of Anisotropic Soil Spatial Variability in the Horizontal Plane on 3D Slope Reliability *Divya Varkey, Michael A. Hicks, and Philip J. Vardon*	(IS21-03) Gaussian Random Fields for Modelling the Influence of Soil and Dredging Variation on Shear-Keys of Immersed Tunnels *C.M.P. 't Hart, O. Morales-Nápoles, and S.N. Jonkman*

9

11:00-11:15	(IS20-07) Prediction of Punch-through Risk of Spudcan Foundation Based on Bayesian Method *Yuan-Yuan Wang, Zhao-Feng Li, Wu-Zhang Luo, and Jin-Hui Li*	(IS8-07) A Machine Learning Prediction Model for Rockburst Based on Oversampling Algorithm and Bayesian-XGBoost *Qing Kang and Yong Liu*	(IS3-17) The Impact of Spatial Variability on Deep Foundation Design for Tall Buildings *Sujatha Manoj and Harry Poulos*	(IS22-08) Experimental Research on Dynamic Parameters of Unit Cell of Deep Mixed Column-Reinforced Soft Clay at Different Stress Levels *Guanbao Ye, Liangkai Qin, Zhen Zhang, Wenqiang Zheng, and Yong Chen*	(IS21-05) Simulations Used in Geotechnical Practice *Burt Look and Wade He*
11:15-11:30	(IS20-09) Three-Dimensional Marine Geological Modeling for Land Reclamation *Te Xiao, Li-Min Zhang, Hai-Feng Zou, and Yue-Bin Liu*	(IS8-09) A Case Study: Monitoring and Prediction for Convergence of Shield Tunnel with Wireless Sensor Network and Long Short-Term Network. *Linghan Ouyang, Jiaping Li, Cong Nie, and Dongming Zhang*	(IS3-19) Study on the Variation of Physical and Mechanical Parameters of Gravel Soil Accumulation along Elevation under Rainfall *Xiaoliang Xu, Jiafu Zhang, and Xiaoping Wang*	(IS22-03) Three-Dimensional Random Field Modeling of Soil Properties Considering Cross-Correlation *Ning Tian and Jian Chen*	(IS21-07) Towards Stochastic Structural and Geotechnical Design for Solar Array Foundation Design *Richard Kelly*
11:30-11:45	(IS20-010) Structural Risk Evaluation Model of Water-Conveyance Tunnel Based on Fuzzy Hierarchical Synthesis Method *An-Dian Lu, Wei Zhang, Xu-Hui Li, Ya-Dong Xue, and Yan-Bin Fu*	(IS8-10) Rockburst Intensity Prediction Based on African Vultures Optimization Algorithm-Random Forest Model *Zhong-guang Wu, Qiang zhu, Zong-wei Chen, and Shun-chuan Wu*	(IS3-20) Stability Analysis of Shield Tunnel Face Considering Spatial Variability of Shear Strength of Argillaceous Siltstone *Xuhui Li, Jiaxu Wang, Andian Lu, Yadong Xue, and Yanbin Fu*	(IS22-09) Impact of the Spatial Variability of Soil Shear Strength on the Stability of an Undrained Clay Slope *Hongzhan Cheng and Jian Chen*	(IS3-18) The Spatial Variability of the Cone Tip Resistance of Weathered Mudstone Profiles from CPT Testing *Yuderka Trinidad González, Kevin Briggs, William Powrie, Nick Sartain, and Simon Butler*
11:45-12:00	(IS20-05) Flood Risk Assessment of Offshore Artificial Islands Induced by Heavy Rainfall *Yan Li, Yu Yan, Ping Shen, and Wan-Huan Zhou*	(IS8-01) Generating accurate synthetic rock acoustic response using semi-supervised regression *Yian Wong and Sau-Wai Wong*	(IS3-12) Probabilistic Slope Stability Analysis with Spatial Soil Variability Using Improved Multiple Kriging Metamodels *Lei-Lei Liu and Shi-Ya Huang*	(IS22-07) Dynamic Reliability Analysis of Three-Dimensional Slopes Considering the Spatial Variability of Soil Parameters *Bin Xu, Yichuan Li, and Rui Pang*	(IS3-15) Spatial Variability of London Clay Using CPT and SPT Data *Wengui Huang, Tom Dijkstra, Fleur Loveridge, Paul Hughes, Anthony P. Blake, Marcus Dobbs, and Yuderka Trinidad Gonzalez*
12:00-12:15	(IS20-02) An Efficient Method for the Discretization of 3-D Random Fields of Soil Properties in the Stochastic Finite Element Analysis of Geotechnical Problems *B. Zhu, H. F. Pei, and Q. Yang*	(IS10-11) Development of Regional Soil Shear Strength Database and Its Application in Probabilistic Analysis of Slope Stability *C.L. Chan, L.A. Wong, W.W.C. Leung, P.W.K. Chung, M.K. Lo, and Andy Y.F. Leung*	(IS3-14) Slope Reliability Analysis Based on Deep Learning of Digital Images of Conditional Random Fields Using CNN *Xin Yin, Zhen Jiang, and Jian Ji*	(IS22-02) Stability Analysis and Failure Mechanism of Three-Dimensional Heterogeneous Slope under Steady State Rainfall *Cheng Qian and Yajun Li*	(IS3-01) Analysis of Multiple Failure Modes for Pile-Reinforced Slope with Soil Spatial Variability *Jing-Ze Li*
12:15-12:30	(IS20-01) Energy-Based Reliability Analysis against Progressive Collapse of a Multi-Span Bridge under Dual Risks of Vessel Impact and Scour *Wen-Jun Lu, Li-Min Zhang, and Shu-Wen Cai*		(IS3-08) Hole Effect: What Is It and Does It Matter? *Jianye Ching*		(IS3-13) Reliability Analysis of a Shallow Foundation Considering Soil Spatial Variability *A.T. Siacara, H.M. Kroetz, A.T. Beck, and M.M. Futai*
12:30-13:40	**Lunch**				

13:40-14:10	**Keynote** – ''Reliability Assessment of Existing Geotechnical Structures'' **Dr. Timo Schweckendiek, Delft University of Technology, Netherlands** Chair: Anna Giacomini *Room: X101*			
14:10-14:40	**Keynote** – ''Slope Reliability Analysis and Risk Assessment: A Modern Computational Perspective'' **Prof. Dianqing Li, Wuhan University, China** Chair: Limin Zhang *Room: X101*			
Sessions	**(IS18) Reliability aspects in geotechnical codes of practice** Chairs: Timo Schweckendiek & Mark van der Krogt *Room: X101*	**(IS14) Risk Assessment of Soil Liquefaction Hazards** Chairs: Yan-Guo Zhou & Jie Zhang *Room: X204*	**(IS13) Data-Centric Geotechnics** Chairs: Chong Tang & Yu Otake *Room: X205*	**(IS7) Bayesian analysis of geotechnical data** Chairs: *Iason Papaioannou, Daniel Straub & Zijun Cao* *Room: X207*	**(IS13) Data-Centric Geotechnics** **&** **(IS15) Earthquake uncertainty, risk, and hazard** Chairs: JP Wang *Room: X208*
14:40-14:55	(IS18-02) Calibration of Resistance Factor Based on Pile Load Test Conducted to Failure *Yuting Zhang and Jinsong Huang*	(IS14-02) Probabilistic Assessment of Spatial Distribution of Soil Liquefaction Potential Using Cone Penetration Test *Zheng Guan and Yu Wang*	(IS13-01) CPT Interpolation and Driven-Pile Capacity Calculation Based on Kriging Method *Fanhua Meng and Huafu Pei*	(IS7-05) Assessment of HMC Parameter Updates for Piping Zone Boundary Detection *Michael C. Koch, Kazunori Fujisaw, and Akira Murakami*	(IS13-08) Applicability of ROM to Seismic Response Analysis of Caisson-Type Seismically Strengthened Quay Walls against Level 2 Ground Motion *Yusuke Fukunaga, Masafumi Miyata, Yu Otake, Naoki Sumioka, Noriki Sugahara, and Masahiro Takenobu*
14:55-15:10	(IS18-11) Updating Epistemic Uncertainty in Reliability Analysis for Pier Pile Stress Using Data in Construction and Maintenance Phase *Masahiro Takenobu, Yasumitsu Mikami, Masafumi Miyata, Shogo Miyajima, Noriki Sugahara, Daisuke Tatsum, Shota Homma, and Yu Otake*	(IS14-03) Probabilistic Fragility Analysis for Seismic Liquefaction of Sites *Jian-Yu Meng and Da-Gang Lu*	(IS13-05) Finding Similar Sites in a Soil Property Database *Atma Sharma and Jianye Ching*	(IS7-06) Monitoring Data-Driven Numerical Modeling of Slope Hydraulic Analysis Using Bayesian Updating with Structural Methods *Xin Liu and Yu Wang*	(IS13-10) Development and Use of Load Test Databases in Foundation Design *Chong Tang*
15:10-15:25	(IS18-01) A Review on the Current Use of RBD in Geotechnical Design Practice in View of the Next Eurocode 7 *Andra Ebener and Kerstin Lesny*	(IS14-04) Regional Liquefaction Evaluation Considering the Effect of Effective Friction Angle and Its Spatial Variability *Zhongling Fu, Mengfen Shen, Su He, Yuming Chen, and Mulin Lan*	(IS13-03) Database-Based Analysis of Various Interpretation Criteria for Barrette Piles in Drained Soils *Yit-Jin Chen, Suneelkumar Laveti, and Anjerick Topacio*	(IS7-08) Efficient Updating of Consolidation-Induced Responses by Auxiliary Bayesian Approach *Hua-Ming Tian, Zi-Jun Cao, Dian-Qing Li, and Xiao Chen*	(IS15-04) Probabilistic Seismic Hazard Analysis Considering Local Ground Motion Observations: Bayesian Approach *Chia-Ying Sung and JP Wan*

15:25-15:40	(IS18-10) Time-Dependent Reliability Analysis of an Existing Sheet Pile Wall Case Study *Mark G. van der Krogt, Timo Schweckendiek, Diego L. Allaix, and I. Ece Özer*	(IS14-01) Comparison of 1D and 2D Liquefaction Assessment Methods Considering Soil Spatial Variability *J.L. González Acosta, A.P. van den Eijnden, and M.A. Hicks*	(IS13-04) Railway Embankment Quality Control Based on Feature Extraction by Singular Value Decomposition and Bayesian Inference *Kohei Kasahara, Susumu Nakajima, Hidetoshi Nishioka, and Yu Otake*	(IS7-12) A Bayesian Framework for Settlement Predictions of Immersed Tunnels *Cong Tang, Wan-Huan Zhou, and Shu-Yu He*	(IS15-01) An Efficient Procedure for Seismic Slope Stability Analysis Considering Input Uncertainties and Soil Spatial Variability *Tingting Zhang, Xiangfeng Guo, Daniel Dias, and Zhibin Sun*
15:40-15:55	(IS18-03) Reliability Approaches to Overcome Load-Resistance Duality in Embedded Wall Design *Álvaro J. Mattos and Edwin F. García*		(IS13-06) Prior Knowledge on Shear Strength and Compressibility of Glaciolacustrine Sediments in Northern Germany *Julia Sorgatz and Martin Pohl*	(IS7-04) Bayesian Regression Models for Predicting Undrained Shear Strength from Piezocone Penetration Tests *Mats Kahlström and Nezam Bozorgzadeh*	(IS15-03) A Study of Data-Driven Seismic Response Analysis Based on the Identification of Temporal Evolutionary Law in Dynamic Systems *Akihiro Shioi , Yu Otake, and Shogo Muramatsu*
15:55-16:10	(IS18-08) Risk Content in Some Existing Geo-Codes *Mabel Chedid and Jean-Louis Briaud*		(IS13-06) Using Bayesian Updating to Improve Forecasts of Embankment Settlements on Soft Soils *Xiao Wan*	(IS7-02) Bayesian Updating of Slope Reliability under Rainfall Infiltration with Field Observations *Shui-Hua Jiang, Xian Liu, and Iason Papaioannou*	
16:10-16:30	**Tea Break**				
16:30-18:00	**ISSMGE Bright Spark Lectures** – *Room: X101* ''Uncertainty Quantification in Data-Driven Geotechnical Stratigraphic Modeling'' **Prof. Hui (Jack) Wang, University of Dayton, USA** Chairs: Andy YF Leung ''Coupled Characterization of Stratigraphic and Geo-properties Uncertainties and Evaluation of the Influences on Geotechnical Performance'' **Prof. Wenping Gong, China University of Geosciences (Wuhan), China** Chairs: Takayuki Shuku ''Risk Management of Cost Overrun and Delay in Underground Excavation in Rock'' **Prof. Johan Spross, KTH Royal Institute of Technology, Sweden** Chairs: Bryant Robbins				