Welcome

On behalf of the Technical Committee and Organizing Committee for the 8th International Congress on Environmental Geotechnics (8ICEG), we are happy to welcome you all to attend 8ICEG to be held in Hangzhou, China, from Oct. 28 to Nov. 1, 2018.

The congress theme is "Towards a Sustainable Geoenvironment." "Sustainable Development is to meet the needs of the present without compromising the ability of future generations to meet their own needs". Geoenvironment is a specific compartment of the environment and comprises portions of geosphere, hydrosphere and biosphere. Under this theme the congress will cover a broad range of topics and will provide an excellent opportunity for academics, engineers, scientists, government officials, regulators and planners to present, discuss and exchange the latest advancements and developments in the research and application of environmental geotechnics.

8ICEG features (1) 21 Plenary Lecturers from 11 countries, which includes 7 academicians, 4 editors of major journals, and 6 chairpersons of international renowned organizations; (2) 4 ISSMGE Bright Spark Lectures honoring distinguished young scholars in geoenvironmental area under age of 36, (3) 20 concurrent sessions containing 216 oral presentations including emerging topics on sustainability, bio-geoengineering and geoenvironmental aspects in energy geotechnics; (4) a session of 22 posters, (5) 3 short courses on solid and hazardous waste landfill design and remediation, and on numerical modelling of THMC processes in porous media and three-dimensional slope stability analysis; and (6) technical visits to Tianziling landfill of municipal solid waste disposal facility and two construction waste recycling facilities.

We also prepared a banquet with China-themed art performance, Impression Westlake show, and 11 exhibitions within this 5-day event to nurture our guests with intellectual feast, Hangzhou cuisine, and World-Heritage level sightseeing.

Financial supports from the National Natural Science Foundation of China (41842018), the Chinese Program of Introducing Talents of Discipline to University (the 111 Project, B18047), the College of Civil Engineering and Architecture of Zhejiang University, and 11 sponsors from the industry are deeply acknowledged.

We sincerely hope that you and the accompanying person enjoy the sweet scent of osmanthus fragrans, the warmth of the discussions and fruitful collaborations initiated or strengthened in 8ICEG!

Sincerely yours,

Yun-min Chen

Chairman of Technical Committee

Liang-tong Zhan

Chairman of Organizing Committee

Under the auspices of:

TC215 Environmental Geotechnics,
ISSMGE

Organized by:

Ministry of Education Key Laboratory of Soft Soils and Geoenvironmental Engineering, Zhejiang University

The Chinese Institution of Soil Mechanics and Geotechnical Engineering (CISMGE)

The Hong Kong Geotechnical Society (HKGES)

Supported by:

International Geosynthetics Society (IGS)

Commission on Radioactive Waste Disposal of International Society for Rock Mechanics (ISRM)

International Waste Working Group (IWWG)

Commission on Waste Disposal of the International Association of Engineering Geology and the Environment (IAEG)

CONGRESS COMMITTEES

International Advisory Committee

Craig H. Benson (USA)
William Powrie (UK)
Abdelmalek Bouazza (Australia)
R. Kerry Rowe (Canada)
Zu-yu Chen (China)
Dai-chao Sheng (Australia)
Raffaello Cossu (Italy)
Devendra N. Singh (India)
Pierre Delage (France)
Kenichi Soga (USA)
Roger Frank (France)
Hywel R. Thomas (UK)
Delwyn G. Fredlund (Canada)
Ikuo Towhata (Japan)
Russell Jones (UK)
Ju Wang (China)
Edward Kavazanjian (USA)
Wei-min Ye (China)
Yuan-ming Lai (China)
Jian-min Zhang (China)
Mario Manassero (Italy)
Jorge G Zornberg (USA)
Charles WW Ng (Hong Kong SAR)

Technical Committee

Chair: Yun-min Chen (China)
Co-Chair: Abdelmalek Bouazza (Australia), Liang-tong Zhan (China)
Secretary: Bate Bate (China), Shuai Zhang (China)

Ishtiaque Anwar (Singapore)
Zhi-ping Lin (Taiwan)
D.N.Arnepalli (India)
Xian-chang Ling (China)
Kazem Badv (Iran)
Song-yu Liu (China)
Xiao-hong Bai (China)
Lurdes Lopes (Portugal)
Loretta Batali (Romania)
Mario Manassero (Italy)
Maria Eugenia Boscov (Brazil)
Nicola Moraci (Italy)
Herminia Cano (Spain)
Catherine Mulligan (Canada)
Roger Clark (UK)
V.G.Ofrikhter (Russia)
Dimitrios Coumoulos (Greece)
Ernest Olinic (Romania)
John Cowland (Hong Kong SAR)
Ali Pak (Iran)
Yujun Cui (France)
Marina Pantazidou (Greece)
Manoj Datta (India)
Fernando Pardo (Spain)
Gemmina Di Emidio (Belgium)
G V Ramana (India)
Andrea Dominijanni (Italy)
Krishna Reddy (USA)
Abbas El-Zein (Australia)
Sergio Anibal Reyes (Argentina)
Evelina Fratalocchi (Italy)
António Roque (Portugal)
Eugene Gallagher (UK)
R. Kerry Rowe (Canada)
Antonio Gens (Spain)
AykutSenol (Turkey)
Jean-Pierre Gourc (France)
Charles Shackelford (USA)
Pin-jing He (China)
Jian-yong Shi (China)
Georg Heerten (Germany)
Luis Sopeña (Spain)
Li-ming Hu (China)
Douglas I Stewart (UK)
Stephan Jefferis (UK)
Antônio Thomé (Brazil)
Han-Yong Jeon (South Korea)
Marc Van Den Broeck (Belgium)
Takeshi Katsumi (Japan)
Qiang Xue (China)
Edward Kavazanjian (USA)
Albert Yeung (Hong Kong SAR)
Eugeniusz Koda (Poland)
Yeliz Yukselen (Turkey)
Hideo Komine (Japan)
DimitriosZekkos (USA)
Ling-wei Kong (China)
Hong-lei Zhou (China)
Craig Lake (Canada)
Wei Zhu (China)
William Likos (USA)

Organizing Committee

Chair: Liang-tong Zhan (Zhejiang U.)
Secretary: Bate Bate (Zhejiang U.), Wen-jie Xu (Zhejiang U.)

Andrea Dominijanni (Secretary of TC215, ISSMGE)
Elizabeth Peggs (Secretary of IGS)
Johnny Cheuk (Secretary of HKGES)
Marco Ritzkowski (Managing Director of IWWG)
Jian-nan Chen (Southwest Jiaotong U.)
Chao-sheng Tang (Nanjing U.)
Yong-gui Chen (Tongji U.)
Su-qin Tang (Hangzhou Environ. Group Co., Ltd)
Abraham C F Chiu (Hohai U.)
Xiao-wu Tang (Zhejiang U.)
Yan-jun Du (Southeast U.)
Hai-jian Xie (Zhejiang U.)
Shi-jing Feng (Tongji U.)
Yong-fu Xu (Shanghai Jiaotong U.)
Ankit Garg (Shantou U.)
Si-fa Xu (Zhejiang U. of Tech.)
Han Ke (Zhejiang U.)
Chuang Yu (Wenzhou U.)
Qi Li (Inst. of Rock and Soil Mechanics, CAS)
Ling-ling Zeng (Fuzhou U.)
Yu-chao Li (Zhejiang U.)
Jian-hong Zhang (Tsinghua U.)
Jiang-feng Liu (China U. of Mining and Tech.)
Wen-jie Zhang (Shanghai U.)
Yang Liu (Hunan U. of Sci. and Tech.)
Zhen-ying Zhang (Zhejiang Sci-Tech U.)
Yue-miao Liu (Beijing Research Inst. Uranium Geology)
Zhi-hong Zhang (Beijing U. of Tech.)
Fan Lv (Tongji U.)
Wei-lie Zou (Wuhan U.)
He-fu Pu (Huazhong U. of Sci. and Tech.)

TABLE OF CONTENTS

CONFERENCE & GENERAL IFORMATION

Conference Information

Location and Conference Address

The conference will be held in the conference center of Sheraton Grand Hangzhou Wetland Park Resort, 1 Westbrook Resort, Zijingang Road, Hangzhou. The specific room for each program is:

Short Courses	Sunday, 28th Oct., 8:30-18:00	Xixi Hall
Opening Ceremony	Monday, 29th Oct., 8:00-8:40	
Plenary Lectures	Monday, 29th Oct., 8:55-18:00 Tuesday, 30th Oct., 8:30-12:00 Wednesday, 31st Oct., 8:30-10:20	
TC Meeting*	Monday, 29th Oct., 20:00-22:00	Boardroom Xiyuan 3&4
Concurrent Session I, II	Tuesday, 30th Oct., 13:30-17:40	Xixi Hall*, Xiyuan 3&4, Boardroom
Concurrent Session III, IV	Wednesday, 31st Oct., 13:20-17:00	
Poster Session	Tuesday, 31st Oct., 17:40-19:00	Xixi Hall
Closing Ceremony	Wednesday, 31st Oct., 17:00-17:30	

** CCES CISMGE TC Meeting is in Xiyuan 3&4, TC215 Meeting is in Boardroom;*

**Xixi Hall will be divided into three parts, Xixi I, Xixi II and Xixi III, for the concurrent sessions.*

Registration and Information Desk

The registration and information desk for 8ICEG will be located at the lobby of Conference center (see "Layout of Conference Center" below). The Short Course registration is in Sheratn Lobby (see "Layout of Sheraton and Routes to Conference Center").

Registration Desk	Saturday, 27th Oct.	9:00-21:00
	Sunday, 28th Oct.	9:00-21:00
Information Desk	Monday, 29th Oct.	8:00-21:00
	Tuesday, 30th Oct.	8:30-21:00
	Wednesday, 31st Oct.	8:30-18:30

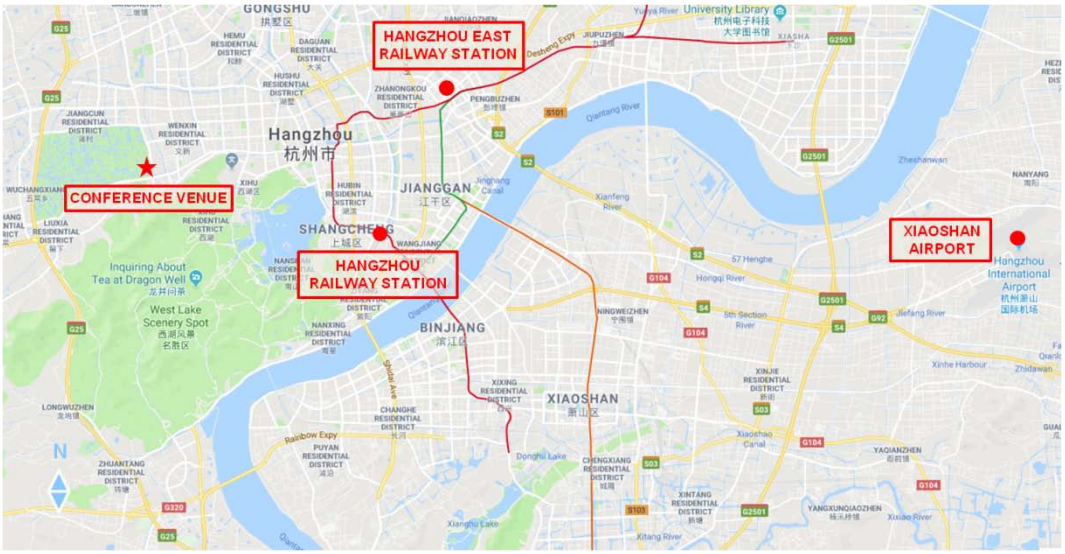
Oral Presentation

Authors are kindly asked to provide their slides before the session. The PPT (slides) copy room is on the 1st floor of the conference center (see "Layout of Conference Center" below). You may wish to use your own notebook if your presentation contains animations. A laser pointer will be provided.

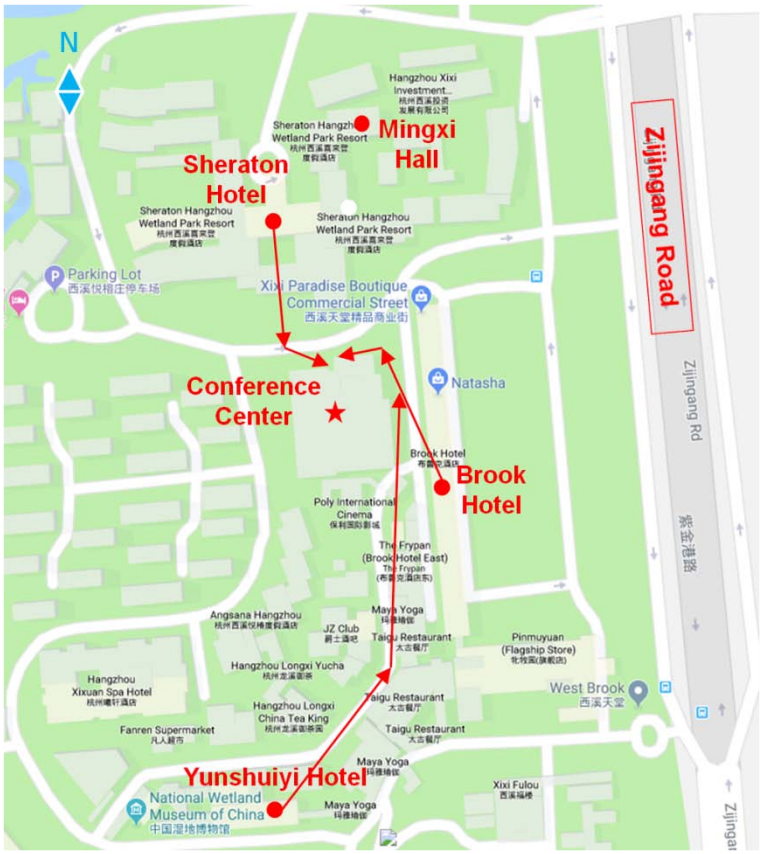
Poster Exhibition

Authors of posters are kindly reminded to stay in the exhibition area for oral introduction of your work during the poster session. The exhibition area of posters is also located on the 1st floor of the conference center (see "Layout of Conference Center" below).

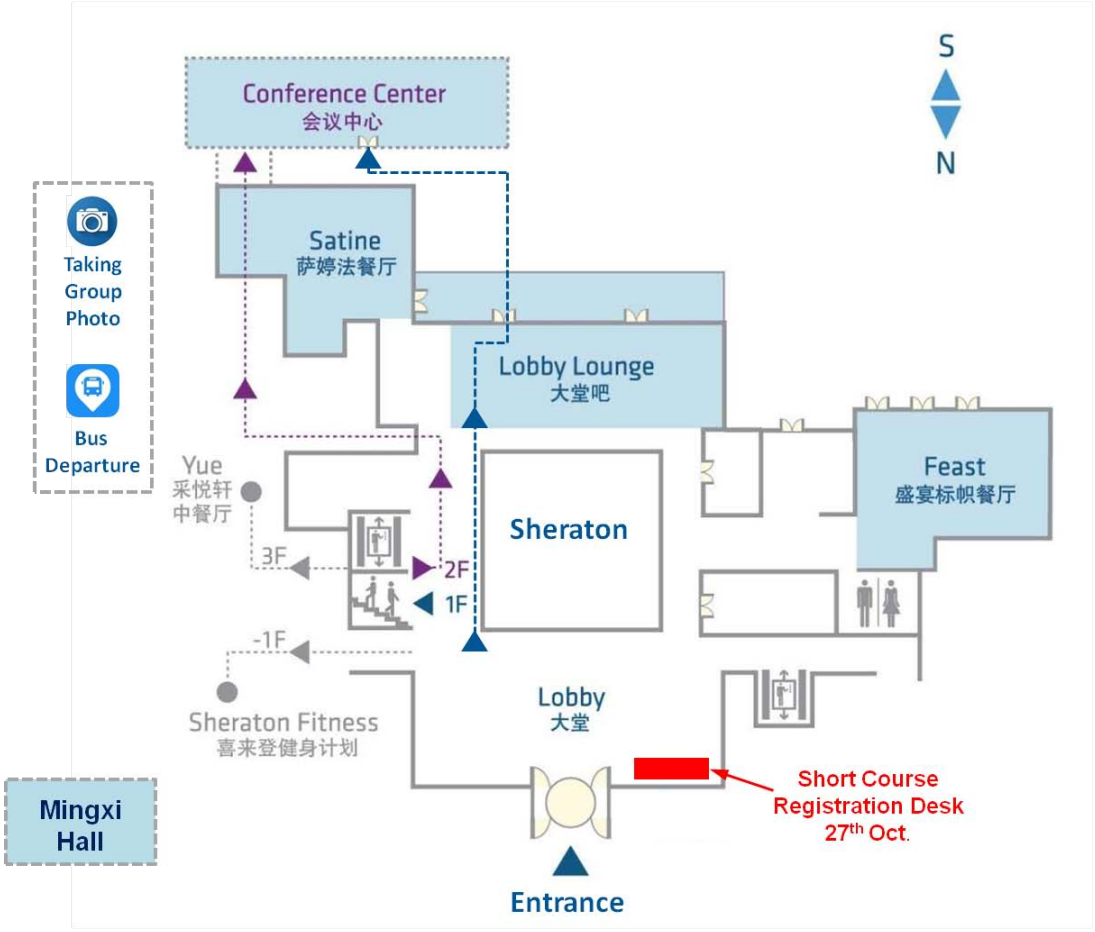
Map of Conference Venue



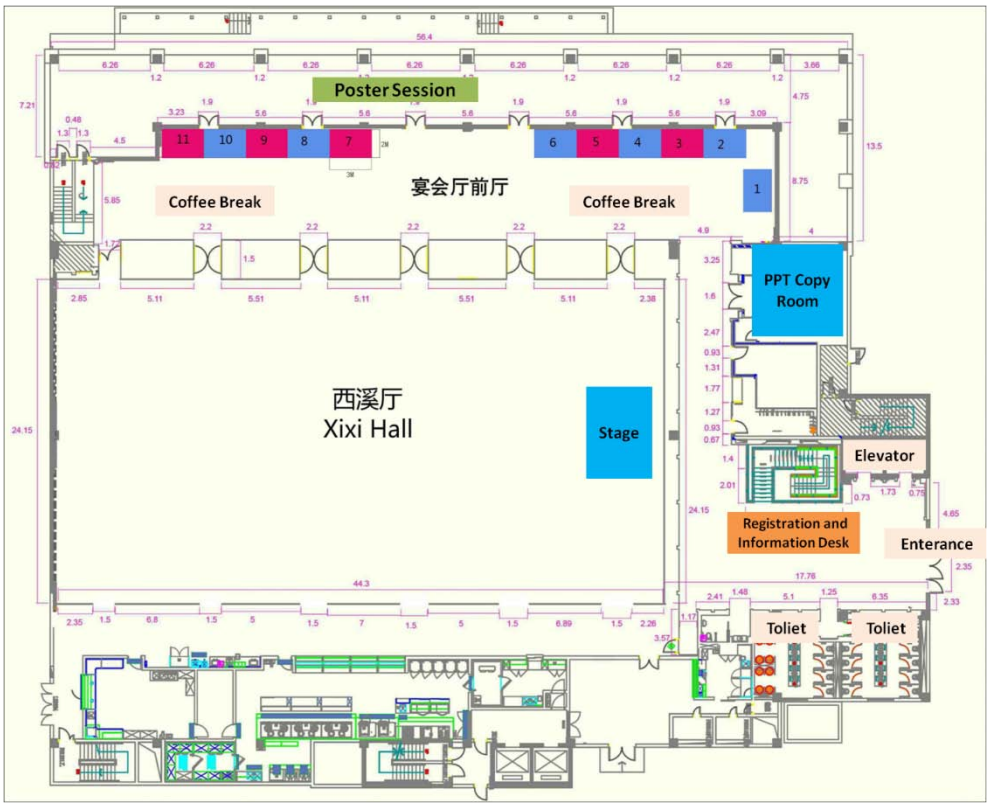
Location of the venue in Hangzhou



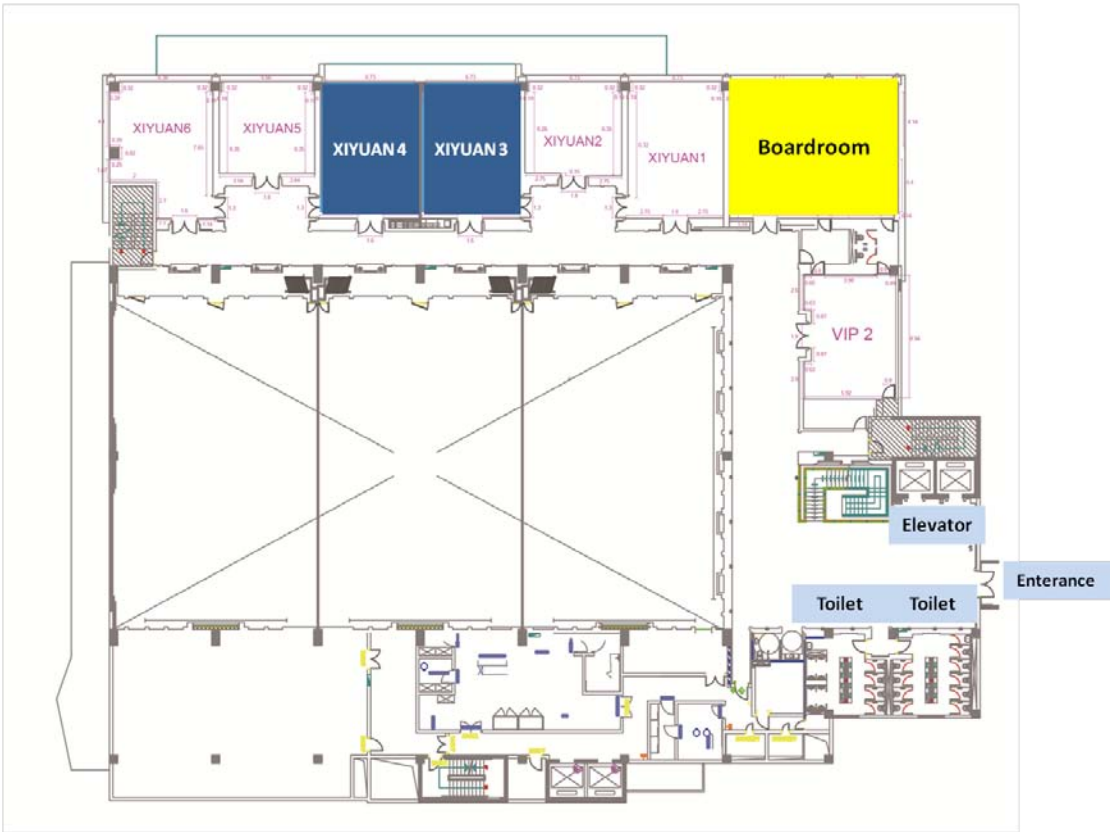
Layout of the conference area



Layout of Sheraton and Routes to Conference Center



(a) 1st Floor



(b) 2nd floor

Layout of Conference Center

General Information

Internet

Wireless internet connection is available in the venue. The name of the network is **"sheraton"**. There are two ways to finish the connecting:

a. If you booked a room in Sheraton, using the room number and booking name as the login information.
b. If you are a visitor and having a phone can receive SMS, asking for a SMS of verification.

Lunch and Dinner

Monday, 29th Oct.	Lunch 12:05 - 13:30	Mingxi Hall of Sheraton
	Dinner 18:00 – 20:00	
Tuesday, 30th Oct.	Lunch 12:00 - 13:30	
Wednesday, 31st Oct.	Lunch 12:10 - 13:20	
	Dinner 17:30 – 18:30	

Congress Group Photo

We are going to take a congress group photo after the opening ceremony. Every delegate is welcome to participate in.

Time: 8:40-8:55

Location: see the figure "Routes from Sheraton lobby to the conference center" above

Bus for Technical Visit and Social Events

Please go to the departure site (see "Routes from Sheraton lobby to the conference center" above) to take bus for Technical Visit and Impression West Lake. The departure time is:

Technical Visit: 8:45	Impression West Lake: 18:30

Climate

27th Oct.	28th Oct.	29th Oct.	30th Oct.	31st Oct.	1st Nov.
20ºC/10ºC	22ºC/11ºC	23ºC/9ºC	21ºC/8ºC	20ºC/9ºC	24ºC/12ºC

Electricity, Power Supply

220 volts AC, 50Hz. Continental three-pin plugs are in use. An adapter might be needed.

Taxi Fare

Single trip between Hangzhou Xiaoshan Airport and the conference venue is about 30 USD or 180 CNY. Please prepare cash (Chinese Yuan) for payment.

Liability

The Organizing Committee and/or Conference Organizers shall not be held liable for personal accidents of losses or damage to private property of registered delegates of the Conference. Delegates should make their own arrangements for purchasing personal insurance.

Contact Us

Transportation inquiry: +86-17787807547 (Mr. Sun) or +86-18069869860 (Mr. Zhang).
General inquiry: +86-18858155495 (Mr. Gao) or +86-19858116676 (Miss Li).
Email: iceg2018@zju.edu.cn

PROGRAM OVERVIEW

Date Time	Sunday 28th Oct.	Monday 29th Oct.	Tuesday 30th Oct.	Wednesday 31st Oct.	Thursday 1st Nov.
8:00-8:30		Opening Ceremony			
8:30-8:40	Short Courses		Lecture V	Lecture VII	
8:40-8:55		Congress Group Photo			
8:55-9:00		Lecture I			
9:00-10:00					Technical Visit (Tianziling MSW Landfill/Construction Wastes Recycling Site)
10:00-10:05			Tea Break		
10:05-10:20		Tea Break			
10:20-10:25				Tea Break	
10:25-10:30		Lecture II			
10:30-10:50			Lecture VI		
10:50-12:00				ISSMGE Bright Spark Lectures	
12:00-12:05			Lunch		
12:05-12:10		Lunch			
12:10-13:20				Lunch	
13:20-13:30				Concurrent Session III	
13:30-15:00		Lecture III	Concurrent Session I		
15:00-15:20				Tea Break	
15:20-15:40			Tea Break	Concurrent Session IV	
15:40-15:50		Tea Break			
15:50-16:00			Concurrent Session II		
16:00-17:00		Lecture IV			
17:00-17:30				Closing Ceremony	
17:30-17:40				Dinner	
17:40-18:00			Poster Session		
18:00-18:30	Reception	Dinner			
18:30-19:00				Impression West Lake	
19:00-20:00			Banquet		
20:00-21:00		TC215 Meeting / CCES CISMGE TC Meeting			
21:00-22:00					

PROGRAM OF PLENARY LECTURES

Date	Group	Time of Presentation	Type of Presentation	Speaker	Topic
Monday 29th Oct.	Lecture I Chairs: Zu-yu Chen, Abdelmalek Bouazza	8:55-9:35	Special Distinguished Lecture	Kerry Rowe	Environmental Geotechnics: Looking back, Looking forward
		9:35-10:05	Invited Lecture	Olaf Kolditz	Workflows in Environmental Geotechnics: Status-Quo and Perspectives
	Lecture II Chairs: Mulligan Catherine, Xiaohong Bai	10:25-11:05	Keynote lecture	Ning-wu Chang	Brownfield Redevelopment at Contaminated Landfill Site
		11:05-11:35	Invited Lecture	Krishna Reddy	Risk, Sustainability and Resiliency Considerations in Polluted Site Remediation
		11:35-12:05	Invited Lecture	Antonio Thome	Remediation Technologies Applied in Polluted Soils: New Perspectives in this Field
	Lecture III Chairs: Daichao Sheng, Wei Zhu	13:30-14:10	Kerry Rowe Lecture	Mario Manassero	On the Intrinsic, State and Fabric Parameters of Active Clays for Contaminant Control
		14:10-14:40	Invited Lecture	Pierre Delage	Micro-macro Effects in Bentonite Engineered Barriers for Radioactive Waste Disposal
		14:40-15:10	Invited Lecture	Devendra Narain Singh	Centrifuge Modeling of Contaminant Transport in Geomaterials
		15:10-15:40	Invited Lecture	Takeshi Katsumi	Towards Sustainable Soil Management - Reuse of Excavated Soils with Natural Contamination
	Lecture IV Chairs: Hideo Komine, Song-yu Liu	16:00-16:30	Invited Lecture	Fu-ming Wang	Jet Grouting for Leakage Prevention with Non-Aqueous Reactive Polymers
		16:30-17:00	Invited Lecture	Abdelmalek Bouazza	Failures in Containment System: Lessons Learned
		17:00-17:30	Invited Lecture	Stephan Jefferis	Low Permeability Vertical Barriers: The State of the Art and the Research Needs for the Future
		17:30-18:00	Invited Lecture	Nathalie Touze-Foltz	Performance Issues of Barrier Systems for Landfills

PROGRAM OF PLENARY LECTURES (continued)

Date	Group	Time of Presentation	Type of Presentation	Speaker	Topic
Tuesday 30th Oct.	Lecture V Chairs: Marcelo Sánchez, Wei-min Ye	8:30-9:00	Invited Lecture	Michael A. Celia	Modeling Geological Storage of Carbon Dioxide with a Focus on Leakage Risk Assessment
		9:00-9:30	Invited Lecture	Liang Chen	Progress of High-level Radioactive Waste Disposal Program in China
		9:30-10:00	Invited Lecture	William Powrie	Climate and Vegetation Impacts on Infrastructure Cuttings and Embankments
	Lecture VI Chairs: Susan Burns, Xue-de Qian	10:30-11:00	Invited Lecture	Edward Kavazanjian	Biogeotechnical Engineering Applications for Environmental Protection and Restoration
		11:00-11:30	General Report	Charles Shackelford	Pollutant Transport
		11:30-12:00	General Report	William Powrie	Waste mechanics
Wednes-day 31st Oct.	Lecture VII Chairs: Dimitrios Zekkos, Qiang Xue	8:30-9:10	Keynote Lecture	Craig Benson	Engineering for Sustainability: New Value Proposition for Differentiation in Environmental Geotechnics
		9:10-9:50	Keynote Lecture	Yun-min Chen	Waste Mechanics and Sustainable Landfilling Technology: Comparison between HFWC and LFWC MSWs
		9:50-10:20	Invited Lecture	Rainer Stegmann	Development of Landfill Management in the Last 30 Years
	Lecture VIII Chairs: Gemmina Di Emidio, Li-ming Hu	10:50-11:10	ISSMGE Bright Spark Lectures	Marta Di Sante	The Reuse of Excavated Soil by Lime Stabilization: Mechanical and Hydraulic Properties
		11:10-11:30	ISSMGE Bright Spark Lectures	Xunchang Fei	Changes in Static and Dynamic Responses of Municipal Solid Waste in Landfills due to Long-term Coupled Degradation Processes
		11:30-11:50	ISSMGE Bright Spark Lectures	Wenjie Xu	A Multi-field Coupling Nodel of Degradable Soils and its Applications in Landfilled Municipal Solid Waste
		11:50-12:10	ISSMGE Bright Spark Lectures	Junjun Ni	Hydrological Contribution of Vegetation to Slope Stabilization: Theory and Experiment

PLENARY LECTURES AND SPEAKERS

R. Kerry Rowe

OC, FRS, NAE, FREng, FRSC, P.Eng., Professor and Canada Research Chair in Geotechnical and Geoenvironmental Engineering
GeoEngineering Centre at Queen's-RMC
Queen's University Kingston Canada

Special Distinguished Lecture Title:

"Environmental geotechnics: looking back, looking forward"
[Time: Monday 8:55-9:35]

Lecture Abstract:

As a discipline within the broader context of geotechnical engineering, Environmental Geotechnics can trace its roots back to the early days of geotechnical engineering and the work on flow through soil and compaction of soil for low permeability (e.g., in earth dams). However, over about the last 35 years, it has evolved considerable and one might wonder if it has now matured or if there are still significant challenges to address? This lecture attempts to highlight some of the advances over the past 35 years in terms of minimizing impact to the environment of waste by containment, collection, and treatment of contaminants as well as minimizing the generation of contaminants.

Looking back, the lecture examines advances in understanding hydraulic conductivity of soils (both clayey and granular soils) permeated by contaminated fluids. It highlights the, now recognised, importance of diffusion of contaminants in well-designed low leakage, or zero leakage, barriers. Progress with respect to the design and operational implications of drainage layers for contaminated fluids is discussed. Finally, the massive growth in the use of geomembranes in fluid containment and the advances in construction quality assurance to minimize holes is examined.

Looking forward, the lecture highlights the needs and challenges of taking a systems approach to environmental geotechnical design. It highlights how the optimization of some components of a barrier system (e.g., a drainage layer) without appreciating the negative effect that this optimization can have on other components (e.g., a geomembrane liner) in municipal and mining environments. It discusses the often underestimated, and sometimes overlooked, interaction between the waste and the barrier system can have on the long term performance of a geomembrane liner. However, not all interactions are negative! The lecture identifies positive interactions between geomembranes and adjacent materials that can substantially reduce leakage and discusses the factors still requiring further detailed investigation in this area. Finally, the lecture touches on construction issues where there is a need to by far more awareness in the industry because of their implications for system performance.

Profile: R. Kerry Rowe

Dr. R. Kerry Rowe was educated and worked as a geotechnical engineer in Australia before emigrated to Canada in late 1978 to take up an academic position. He has published prolifically on, and has extensive research and consulting experience in, geotechnical, geosynthetics, waste management and geoenvironmental engineering including the design and/or peer review of hydrogeology and design of landfills. Recognized by numerous awards, the distinguished lectures he has presented include the Giroud, Rankine, Casagrande, and the ASCE Karl Terzaghi Lectures. In 2013, the International Society for Soil Mechanics and Geotechnical Engineering created the R. Kerry Rowe Lecture. He is a Fellow of the Royal Society (of London, UK), Royal Academy of Engineering, the Royal Society of Canada, the Canadian Academy of Engineering, and a foreign Member of the U.S. National Academy of Engineering. He is a past president of the International Geosynthetics Society, the Canadian Geotechnical Society and the Engineering Institute of Canada and editor of the journal Geotextiles and geomembranes.

Mario Manassero

Professor, Ph.D, Politecnico di Torino, c.so Duca degli Abruzzi 24, 10129 - Torino, Italy

Kerry Rowe Lecture Title:

"On the intrinsic, state and fabric parameters of active clays for contaminant control"
[Time: Monday, 13:30-14:10]

Lecture Abstract:

The osmotic, hydraulic and self-healing efficiency of bentonite based barriers (e.g. geosynthetic clay liners) for containment of polluting solutes are governed both by the physico-chemical intrinsic parameters of the bentonite, i.e. the solid phase density (ρ_{sk}), the total specific surface (S), the Stern fraction (f_{Stern}) and the total fixed negative electric surface charge (σ), and by the state and fabric parameters able to quantify the soil density and microstructure, i.e. the total (e) and nano (e_n) void ratio, the average number of platelets per tactoid ($N_{l,AV}$), the effective electric fixed-charge concentration ($\bar{c}_{sk,0}$), and the Stern fraction (f_{Stern}). In turn, the fabric parameters seem to be controlled by the effective stress history, ionic valence and related exposure sequence of salt concentrations in the pore solution. A theoretical framework, able to describe the coupled chemical, hydraulic and mechanical behaviour of bentonites, has been set up. In particular, the relationships, which link the aforementioned intrinsic, state and fabric parameters of a given bentonite with its hydraulic conductivity (k), effective diffusion coefficient (D_s^*), osmotic coefficient (ω) and swelling pressure (u_{sw}) under different stress-histories and solute concentration sequences, are presented. The proposed theoretical framework has been validated through the comparison of its predictions with some of the available experimental results that have been obtained through the use of the last version of an *ad hoc* equipment able to detect, within a unique time step, all the aforementioned performance parameters, apart the hydraulic conductivity (k) that has been anyway measured by just a further time step carried out always with the same equipment and on the same bentonite sample.

Profile: Mario Manassero

Mario Manassero is the Vice-President for Europe of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) for the term 2017-2021, former chairman of Technical Committee 215 "Environmental Geotechnics" of ISSMGE from 2001 to 2014. He obtained his Civil Engineering degree in 1980 at Politecnico di Torino and received his Ph.D. at the same university in 1987. He has been visiting professor at University of Ancona from 1988 to 1993, Ghent University in 1996 and at Colorado State University in 1995. Since 1998, he has been professor of Geotechnical Engineering at Politecnico di Torino. His main research activities are characterization of soil deposits by in-situ tests, soil improvement and reinforcement, containment systems for landfills and polluted subsoils, vacuum extraction of subsoil pollutants and the mechanical behavior of municipal and industrial solid wastes. He also addressed the chemo-physical interaction between pore fluids and the solid skeleton of active clays, the multiphase coupled flows and the associated subsoil pollutant transport phenomena. He was involved many signature projects in Venice lagoon, Rome International Airport, Portoscuso (Italy), Cengio (Italy), and Victoria (Australia). He has authored, co-authored and/or edited five books and more than 150 technical and scientific papers in journals and conference proceedings. He delivered the State-of-the-Art Lecture on Environmental Geotechnics at GEOENG2000 conference in Melbourne, Australia in 2000, and the second R. Kerry Rowe Lecturer at the 19th International Conference on Soil Mechanics and Geotechnical Engineering (ICSMGE), Seoul, Korea in 2017.

Craig H. Benson

Ph.D, PE, FNAI, NAE, Dean of the School of Engineering at the University of Virginia, and the Hamilton Endowed Chair in Engineering.
Director of Sustainability Research and Education for the University of Wisconsin-Madison.

Keynote Lecture Title:

"Engineering for Sustainability: New Value Proposition for Differentiation in Environmental Geotechnics"
[Time: Wednesday, 08:30 - 09:10]

Lecture Abstract:

The historical approach to engineering has focused on minimizing realized costs while achieving performance objectives for the engineered system. This approach ignores externalities (hidden costs) associated with irrecoverable resource consumption, disease related to pollution, and ecosystem deterioration. The traditional approach has led to large waste generation rates in developed societies due to one-pass material usage, contributing to significant environmental degradation. Poor management of these wastes led to the formation of environmental geotechnics and geoenvironmental engineering, which have focused primarily on protective waste containment systems and environmental remediation. A topic of considerable interest in these disciplines today is reuse and/or repurposing of wastes in new applications to promote sustainability -- that is, finding or creating value in materials previously considered useless in engineering applications where they have similar or superior performance as new materials for the betterment of society. Engineering predictions coupled with life cycle assessment (LCA) can be used to identify reuse and repurposing strategies that are cost-effective in terms of realized costs as well as externalities. Examples are provided illustrating how favorable sustainability metrics are achieved by extracting materials from the waste stream, processing if necessary, and repurposing in lieu of traditional materials used in geoengineering. The important role of LCA is illustrated using an example of waste repurposing that has unfavorable sustainability metrics. Recommendations are made that geoengineers can incorporate into their practice to reduce waste generation, increase utilization, and promote sustainability for society.

Profile: Craig H. Benson

Craig H. Benson is Dean of the School of Engineering at the University of Virginia as well as the Hamilton Endowed Chair in Engineering. Dr. Benson has a BS from Lehigh University and MSE and PhD degrees from the University of Texas at Austin. Prior to joining the University of Virginia, Dean Benson was appointed as a Distinguished Professor, Chair of Civil and Environmental Engineering, and Chair of Geological Engineering at the University of Wisconsin-Madison. He was also Director of Sustainability Research and Education for the University of Wisconsin-Madison, leading one of the three cross-campus strategic initiatives.

Dr. Benson is an eminent engineering scholar and serves on the Environmental Engineering Committee of US Environmental Protection Agency's Science Advisory Board and ExxonMobil's Sustainability Advisory Committee. He is a fellow of the National Academy of Inventors (NAI) and the National Academy of Engineering (NAE).

Ning-Wu Chang

Ph.D., P.E., Senior Hazardous Substances Engineer
Department of Toxic Substances Control, California Environmental Protection Agency

Keynote Lecture Title:

"Brownfield Redevelopment at Contaminated Landfill Site"
[Time: Monday, 10:25- 11:05]

Lecture Abstract:

The legacy landfill sites are old landfills that have been ceased operations but have received mixed solid waste that may contain municipal waste, commercial solid waste, industrial solid waste, or waste material that is included within the definition of hazardous waste. Due to lack of proper controls, these legacy landfill sites usually caused environmental impacts. Yet, these contaminated landfill sites have been selected for brownfield redevelopment due to their locations and property sizes. To facilitate the redevelopment, the remediation of these contaminated landfill site has to be designed and integrated with the site redevelopment to avoid conflict between the remedial system and the redevelopment site features. The typical presumptive remedy for landfill involves a containment approach, including landfill cover, gas collection and treatment, leachate/groundwater mitigation system. In addition, due to waste remains on-site, future operation and maintenance of the remedial system will be required. The requirement of this presumptive remedy must be maintained for protectiveness for future uses, yet the remediation system has to accommodate and be integrated with developer needs to have a usable and attractive development. A proactive approach to have both development and remediation teams to understand how redevelopment design and construction can accommodate the remediation system is critical in order to maintain protectiveness for future use of the site.

Profile: Ning-Wu Chang

Dr. Chang earned his master and doctor degrees in environmental engineering from University of North Carolina at Chapel Hill. He is currently working for the Department of Toxic Substances Control, California Environmental Protection Agency. he is involved in soil and groundwater remedial investigation, feasibility study, and remedial design, as well as hazardous waste facility permitting. He has served as technical lead of brownfield site redevelopment and California superfund site projects. Prior to working with the State, Dr. Chang worked for environmental engineering consulting companies for more than 15 years. Dr. Chang has extensive experiences in evaluation and design of municipal and industrial water and wastewater treatment systems, soil and groundwater remediation, landfill leachate treatment system evaluation and design, and waste minimization. He also participated in Interstate Technology Regulatory Council (ITRC) as a team leader in developing several guidance documents. He is a licensed civil engineer in California, and a member of the Southern California Chinese Environmental Protection Association and the Overseas Chinese Environmental Engineers and Scientists Association.

Yunmin Chen

Academician of Chinese Academy of Sciences
Dean, Faculty of Engineering, Zhejiang University
Director, Institute of Geotechnical Engineering, Zhejiang University

Keynote Lecture Title:

"Waste Mechanics and Sustainable Landfilling Technology: Comparison between HFWC and LFWC MSWs"
[Time: Wednesday, 09:10 - 09:50]

Lecture Abstract:

Waste mechanics focuses on the degradation characteristics and mechanical behaviors of municipal solid waste (MSW). Knowledge of waste mechanics helps solve the severe geoenvironmental challenges for MSW landfills. This paper first summarized and compared the physical components and chemical composition of MSWs from 20 countries, including developed and developing countries, and proposed a MSW classification sys-tem based on the food waste content and the ratio of cellulose to lignin. Secondly, the degradation characteristics between high food waste content (HFWC) and low food waste content (LFWC) MSWs, originated from their differences in chemical composition due to the distinctions in physical components of MSWs, were compared quantitatively by mass loss, leachate generation, landfill gas (LFG) generation, and contaminants in leachate. Thirdly, mechanical behaviors closely related to the degradation characteristics of both HFWC and LFWC MSWs, including permeability, compressibility, shear strength, and lateral pressure, were elaborated on. Fourthly, degrees of hydrolysis, methane generation, and consolidation, calculated by the stabilization-consolidation model, were introduced to characterize the stabilization process of HFWC MSW landfills, which provided a basis for sustainable landfilling for HFWC MSW landfills. The obtained features of HFWC MSW landfills, including the distributions of leachate mounds and LFG, settlement, and slope stability, showed the causes of main geo-challenges at HFWC MSW landfills, including high risks of leachate leakage and slope instability, and low LFG collection efficiency, were consistent with the monitoring results of several cases. Finally, technologies, practices, and designs towards sustainable landfilling for HFWC MSW landfills in China were presented, which could also serve as useful references and guidelines for other countries in similar situations.

Profile: Yunmin Chen

Prof. Yunmin Chen is the director of Research Center for Hypergravity of Zhejiang University, and the director of the Ministry of Education Key Laboratory of Soft Soils and Geoenvironmental Engineering. He received his bachelor, MSc and Ph.D. degrees from Zhejiang University in 1983, 1986 and 1989, respectively. He was elected as the Academician of Chinese Academy of Sciences in 2015. He is a ISSMGE-TC 215 member, the chairman of Chinese Association of Environmental Geotechnics, the vice board chairman of Chinese Technical Association on Geosynthetics and the vice chairman of soil mechanics council in Chinese Hydraulic Engineering Society. He serves as the co-Editor-in-Chief of journal Transportation Geotechnics and the editorial board member of journal Waste Management. and journal Soil Dynamics and Earthquake Engineering.
Prof. Chen's research interests include environmental geotechnics, soil dynamics and foundation engineering. He has published over 480 papers and been invited as a keynote lecturer for 12 international conferences or symposiums. He is the chief scientist of the 973 Program (the National Basic Research Program of China) project of 'Fundamental Study of Mechanism and Sustainable Control of Environmental Disasters Induced by MSW Landfilling'. He is also the chief editor of Technical Code for Geotechnical Engineering of Municipal Solid Waste Sanitary Landfill (CJJ 176-2012). He proposed techniques for the control of waste slope failure, landfill gas emission and leachate leakage contamination in municipal solid waste landfills, and provided consultation to more than 28 landfills.

Abdelmalek Bouazza

Professor, Monash University, Department of Civil Engineering, Melbourne, Australia

Invited Lecture Title:

"Failures in Containment System: Lessons Learned"
[Time: Monday, 16:30 - 17:00]

Lecture Abstract:

Forensic investigation of failures plays an important part in the improvement of the understanding of the key parameters that govern the performance of waste containment facilities. Important lessons can be learned regarding the significance of the assumptions, parameters and methods used in design and on the controlling influence of site conditions and construction processes. The lecture will explore the causes of failures of several cases and will discuss lessons learned from these cases.

Profile: Abdelmalek Bouazza

Dr A (Malek) Bouazza is a Professor of Civil Engineering at Monash University, Melbourne, Australia. He is a Visiting Distinguished Professor at Zhejiang University, China. He is a Fellow of the Institution of Engineers (FIEAust). His research has been recognised by a number of awards including, recently, the 2018 International Geosynthetics Society Award for outstanding contribution to advances in the scientific and engineering developments of geosynthetics, the 2017 Telford Premium Prize, Institution of Civil Engineers, U.K., the 2015 R.M. Quigley Award (honourable mention) from the Canadian Geotechnical Society, the 2014 E.H. Davis Memorial Award from the Australian Geomechanics Society, among many others. Currently, he is the Chair of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE) Technical Committee TC 215 on Environmental Geotechnics and the Secretary of ISSMGE TC308 on Energy Geotechnics. He is an editorial board member of 8 International Journals. In addition to his academic commitments, Dr Bouazza gives specialist advice for the industry both nationally and internationally. His work has included peer review of design for more than 30 municipal solid waste and hazardous landfills and tailings storage facilities in Australia, Thailand, Peru and other countries. He has led and co-wrote the key liner components of new landfill standard (Best Practice Environmental Management: Siting, design, operation and rehabilitation of landfills, EPA Publication 788) for the State of Victoria, Australia. Dr Bouazza has been a key advisor to EPA Victoria on landfill design and operation and has been appointed in 2015 to the EPA Victoria independent landfill expert panel to provide peer review advice on complex landfill proposals to improve the efficiency and certainty associated with landfills approval process. He has performed, in this capacity, peer review of the lining design of most of the major landfills in Victoria.

Michael A. Celia

Professor, NAE, Department of Civil and Environmental Engineering, and Princeton Environmental Institute, Princeton University.

Invited Lecture Title:

"Modeling Geological Storage of Carbon Dioxide with a Focus on Leakage Risk Assessment"
[Time: Tuesday, 08:30 - 09:00]

Lecture Abstract:

Carbon Capture and Storage, or CCS, is a technology that involves capture of CO_2 from large point sources and subsequent injection of the captured CO_2 into deep geological formations. In order for CCS to be effective, the injected CO_2 must remain in the injection formation for centuries to millennia. One of the most important environmental concerns associated with large-scale CCS is the possible leakage of fluids from the deep injection formation into shallow fresh-water aquifers, which serve as sources of drinking water. Potential leakage pathways include natural or induced fractures and faults, and old abandoned wells drilled for the purpose of oil and gas exploration and production. Fluid migration along old wells is usually considered to be the highest leakage risk, especially in places like North America where millions of old oil and gas wells are co-located with the best locations for CO_2 injection.

The system involves multi-phase fluid flow in complex rock systems, described by a set of coupled, nonlinear partial differential equations. In this lecture, I will present an overview of the governing equations, and then focus on models we have developed to analyze leakage risks associated CO_2 injection with a specific focus on possible leakage of both CO_2 and displaced brine along old wells. These models use a set of simplifying assumptions, which are appropriate for the underlying physics associated with many injection scenarios. I will also describe several measurement programs that have yielded new data and information about effective hydraulic properties of old wells. Finally, I will combine the modeling and data to provide a quantitative estimate of leakage risks for a specific field site in the Province of Alberta in western Canada. The talk will conclude with brief comments on the future prospects for large-scale CCS and its possible role in a carbon-constrained world.

Profile: Michael A. Celia

Professor Michael Celia is the Theodora Shelton Pitney Professor of Environmental Studies at Princeton University, where he serves as Director of the Princeton Environmental Institute. He is also a Professor in the Department of Civil and Environmental Engineering. His areas of research include ground-water hydrology, multi-phase flow in porous media, numerical modeling, and subsurface energy systems with a focus on geological sequestration of carbon dioxide and shale-gas systems. The carbon sequestration work is part of a large industry-funded multi-disciplinary effort at Princeton known as the Carbon Mitigation Initiative. Professor Celia served for 10 years as editor of the journal *Advances in Water Resources*. He is a Fellow of the American Geophysical Union (AGU) and the American Association for the Advancement of Science (AAAS) and the recipient of the 2005 AGU Hydrologic Science. He was the 2008 Darcy Lecturer for the National Ground Water Association, and received the 2014 Honorary Lifetime Membership Award from the International Society for Porous Media (Interpore). In 2016 Professor Celia was elected to the U.S. National Academy of Engineering. He has also received several teaching awards, the most recent being the Distinguished Teaching Award from the School of Engineering and Applied Science at Princeton, awarded June 2017.

Pierre Delage

Professor, Ecole des Ponts ParisTech, France

Invited Lecture Title:

"Micro-macro Effects in Bentonite Engineered Barriers for Radioactive Waste Disposal"
[Time: Monday, 14:10 - 14:40]

Lecture Abstract:

The paper summarizes the findings of various investigations carried out for some time in the research group on unsaturated soils at Ecole des Ponts ParisTech. It focusses in more details on the links that can be made between nano, micro, and meso scale phenomena, and the macroscopic response of various Engineered Barrier Systems (EBS) made up of bentonite and used in various concepts of radioactive waste disposal at great depth. Meso-scale observations using X-Ray microtomography usefully complete some findings established by using more standard techniques of microstructure investigation, like scanning electron microscopy and mercury intrusion porosimetry. The morphology of sand-bentonite and pellet-bentonite powder mixtures can be better understood, together with their changes during hydration. Also, nano-scale mechanisms that govern the hydration of smectites through the consecutive and ordered placement of layers of water molecules along the faces of the smectite minerals are useful for a better understanding of the macroscopic response of Engineered Barrier Systems submitted to hydration under constrained volume conditions. It appears that the more energetic adsorption levels are those corresponding to 1 and 2 water molecules (1 and 2W hydration) that are still involved during constant volume hydration, whereas the difference between constant and free volume hydration starts at lower suction (between 5 and 10 MPa) during the placement of the third layer (3W). These mechanisms also play a role in the hydration of pellets, and help to better understand the hydration of Engineered Barrier System. Some conclusions drawn should also apply in the case of surface waste disposals based on the use of Geosynthetic Clay Liners.

Profile: Pierre Delage

Pierre Delage, Professor of Geotechnical Engineering at Ecole des Ponts ParisTech, contributed to the development of CERMES (the geotechnical group of Ecole des Ponts, now included in Laboratoire Navier), that he directed from 2003 to 2010. He developed researches on the fundamentals mechanisms governing the macroscopic response of multi-phase soils and rocks submitted to changes in stress, water content and temperature, with some pioneering contributions on the role of the changes in pore size distribution in the volume change behaviour of soils, the stress-strain and failure behaviour of unsaturated soils or the thermal behaviour of claystones. His researches concerned sensitive clays, deep marine sediments, unsaturated soils, compacted soils, loess, oil reservoir chalks, oil sands, claystones and shales and, more recently, Martian regoliths, in the framework of the NASA mission InSight on Mars (landing planned on 26 November 2018).

He is a corresponding member of the French Academy of Agriculture, has been Chief editor of the "Revue Française de Géotechnique" and "Géotechnique Letters". He has been or still is member of various editorial panels (Géotechnique, Computers and Geotechnics, Geotechnical Testing Journal, Geomechanics and Geoengineering, Rivista Geotecnica Italiana). He organised, with E. Alonso, the 1st International Conference on Unsaturated Soils in Paris (1995), played an active role in the 18th International Conference on Soil Mechanics and Geotechnical Engineering (Paris 2013) and chaired the 3rd European Conference on Unsaturated Soils (Paris 2016). He serves since 2013 as Chair of the Technical Oversight Committee of the International Society of Soil Mechanics and Geotechnical Engineering, in charge of supervising the activities of the 32 Technical Committees of the ISSMGE, under both Roger Frank and Charles Ng's Presidential terms.

Nathalie Touze-Foltz

Dr., Irstea Antony, France

Invited Lecture Title:

"Performance Issues of Barrier Systems for Landfills"
[Time: Monday, 17:30 - 18:00]

Lecture Abstract:

The objective of the paper is to give an update in key topics related to performance issues of barrier systems for landfills. The objective of using barrier systems is to minimize the impact of contaminants on the surrounding environment. To achieve this goal puncture protection of the geomembrane must be ensured. An update is first given is this matter. The question of the stability on slope of geosynthetic barrier systems is then discussed and an insight is given in modeling and laboratory measurement of parameters required to perform reliable modeling, especially as regards the case of piggy-back landfills. Finally, the question of transfers though bottom barrier systems is addressed, giving an update especially in the analytical solutions developed in the past 10 years in China in this matter.

Profile: Nathalie Touze-Foltz

Dr. Touze-Foltz has been conducting research on geosynthetics for the past 25 years, with particular emphasis on environmental applications. She has authored about 200 papers. She is the head of two regional centers of Irstea in Antony and Nogent-sur-Vernisson. Irstea is a French public research institute, which has been at the forefront of geosynthetic research since 1972. She serves or has served on a number of national technical committees especially for the use of geosynthetic clay liners and geomembranes. Her experience has been acknowledged in the field of standardization and she has served as convenor of WG4 (hydraulics) in ISO TC 221 and CEN TC 189. She is currently president of the French Chapter of IGS and vice-president of the IGS. Dr Nathalie Touze-Foltz was a Keynote Lecturer at the Eurogeo 4 and Eurogeo 5 conferences. She was also an invited lecturer at the 7th International Conference on Environmental Geotechnics in 2014 (Melbourne, Australia). She was recently awarded the 6th Giroud lecture in Seoul along the 11th International Conference on Geosynthetics (Healing the world: a Geosynthetics solution).

Stephan Jefferis

Director, Environment Geotechnics Ltd and Visiting Professor, University of Oxford.

Invited Lecture Title:

"Low permeability vertical barriers: the state of the art and the research needs for the future"
[Time: Monday, 17:00 - 17:30]

Lecture Abstract:

This paper will provide a 50-year perspective on vertical barriers formed by slurry trench techniques for applications such as dams and levees and the control of groundwater migration from landfills and contaminated sites.

The paper will consider the behaviour of the basic materials used in cut-off construction focusing on issues that are often overlooked. It will then consider laboratory and field testing for the assessment of barrier performance at the time of construction as well as in the longer term. Interaction with contaminants in the ground is always a concern for barriers and it is recognised that there is a plethora of papers on the effect of chemical contaminants on landfill liner materials and to a lesser extent on vertical barrier materials. However, a missing element from many laboratory reports is an attempt to scale-up the results from the laboratory to predict long-term performance in the field. A basic approach to scale-up and the use of laboratory data will be presented.

Another much-researched area of barrier performance is sorption of contaminants on barrier materials and hence retardation of contaminant migration fronts. However, it has to be recognised that unless there is biodegradation of sorbed contaminants in the barrier their storage in the barrier is temporary. If the source chemistry changes/evolves, one contaminant can be displaced by another if of higher concentration and/or if it is more strongly bound. The displaced contaminant can then be ejected from the barrier at higher concentration than originally input.

As vertical barriers technologies are well-established, research needs might be thought to be limited. However, applications continue to develop, ever deeper walls in yet more challenging environments. It is time for more full-scale testing of barriers with monitoring over timescales of decades not days to explore the often overlooked effects of long-term permeation by natural waters and volume change of barrier materials in service.

Profile: Stephan Jefferis

Professor Stephan Jefferis is a director of Environmental Geotechnics Ltd and a Visiting Professor in the Department of Engineering Science at the University of Oxford. He is the immediate past Chairman of the British Geotechnical Association. He has worked on major projects across the World and has over 45 years' experience in the investigation and resolution of unusual materials and environmental problems often associated with natural chemical and microbiological processes in the ground. He has worked on cutoff walls and excavation support fluids for decades and is co-author of the book 'Polymer support fluids in civil engineering'.

Takeshi Katsumi

Professor, Dr. Eng, Graduate School of Global Environmental Studies, Kyoto University, Japan

Invited Lecture Title:

"Towards sustainable soil management - Reuse of excavated soils with natural contamination"
[Time: Monday, 15:10 - 15:40]

Lecture Abstract:

Status of regulations, practices, and challenges on the reuse of excavated soils with natural contaminations in Japan are introduced in this presentation. Geotechnical and geoenvironmental efforts have been conducted in recent years to contribute to the cost-effective measures to reuse such excavated soils under proper contaminant control. Evaluations of leaching behavior from the soils of concern as well as attenuation capacity of the surrounding ground are both essential to design the cost-effective measures. Since methods and/or protocols which consider the nature of natural contamination are required, several different leaching tests were performed on different types of soils and rocks with natural contaminations by the presenter and his colleagues. A series of these experimental works revealed that the testing conditions of column leaching tests, such as column length and flow rate, should carefully be decided to simulate the situations where the soils are reused in embankments or other geotechnical applications. Either original grounds or soil layers installed beneath the naturally contaminated soils are expected to function as attenuation layer. Therefore, attenuation capacities of several different types of soils are discussed. Effects of mineral agents enhancing the sorption performance are introduced. Case histories of the utilization of the "recovered" soils obtained from disaster debris of 2011 East Japan earthquake are presented. Harmonization of technical implementations, regulations, and social acceptances are required for further and proper reuse of excavated and recovered soils.

Profile: Takeshi Katsumi

Takeshi Katsumi is Professor at the Graduate School of Global Environmental Studies (GSGES), Kyoto University, Japan, and is currently Vice Dean of GSGES since April 2018. He graduated from the Department of Civil Engineering, Kyoto University, and obtained his doctoral degree from the same university in 1997. He has research interests in a variety of topics of environmental geotechnics, including waste landfills, remediation of contaminated sites, and reuse of by-products in geotechnical applications. He has received several awards including the "JSPS PRIZE" by the Japan Society for the Promotion of Science. He has been a member of ISSMGE Technical Committee No.215 on Environmental Geotechnics for more than 15 years, and acted as the International Secretary of the Japanese Geotechnical Society (JGS) from 2014 to 2018. He has been involved in several projects regarding the recovery works from the 2011 East Japan earthquake and tsunami.

Edward Kavazanjian, Jr.

Ph.D., P.E., NAE, Dist.M.ASCE, Regents Professor and Ira A. Fulton Professor of Civil Engineering

Invited Lecture Title:

"Biogeotechnical Engineering Applications for Environmental Protection and Restoration"
[Time: Tuesday, 10:30 - 11:00]

Lecture Abstract:

Biogeotechnical engineering can contribute to environmental protection and ecological restoration in several different ways. Soil and groundwater remediation is the most common and most mature application of biogeotechnical engineering in engineering practice. However, soil and groundwater remediation is still a developing field and new and enhanced biogeotechnical techniques to mitigate soil and groundwater contamination are constantly being developed. Furthermore, there are a variety of ways in which biogeotechnical techniques can contribute to environmental protection and restoration. New and enhanced biogeotechnical techniques for soil and groundwater remediation under development include sequestration of groundwater contaminants via co-precipitation with carbonates, reduction and precipitation of chromium, arsenic and selenium, removal of nitrogen while precipitating phosphorous from ground and surface water, and microbial chain elongation to provide energy for beneficial microbiological processes. Other biogeotechnical applications in environmental protection and remediation include fugitive dust control, mitigation of soil erosion due to surface water runoff, mitigation of the potential for internal erosion of soil in dams, levees, and embankments, and creation of low permeability subsurface barriers. Replacement of Portland cement as a binder for aggregates, i.e., biocementation, also contributes to environmental protection through the reduction in carbon dioxide emissions associated with Portland cement manufacture.

Profile: Edward Kavazanjian, Jr.

Dr. Edward Kavazanjian, Jr. is a Regents Professor and the Ira A. Fulton Professor of Geotechnical Engineering at Arizona State University. He joined the faculty at Arizona State University in August 2004 after 20 years as a practicing geotechnical engineer. Dr. Kavazanjian has Bachelor and Master of Science degrees in Civil Engineering from M.I.T. and a Ph.D. in Geotechnical Engineering from the University of California at Berkeley. In 2013, he was elected to the National Academy of Engineering for his work on design and construction of landfills and geotechnical earthquake engineering. He is recipient of the 2009 Ralph B. Peck Award, 2010 Thomas A. Middlebrooks Award, and the 2011 Terzaghi Award from the American Society of Civil Engineers (ASCE). In August 2015, he became Director of the Center for Bio-mediated and Bio-inspired Geotechnics (CBBG), a National Science Foundation-funded Engineering Research Center dedicated to the emerging sub-discipline of biogeotechnical engineering.

Olaf Kolditz

Prof. Dr.-Ing. habil., Helmholtz Centre for Environmental Research – UFZ
Head of Department Environmental Informatics
Full Professor for Applied Environmental Systems Analysis at Technische Universität Dresden

Invited Lecture Title:

"Workflows in Environmental Geotechnics: Status-Quo and Perspectives"
[Time: Monday, 09:35 - 10:05]

Lecture Abstract:

Environmental systems are complex. For unravelling this complexity both observation and modelling concepts are being developed and applied - unfortunately operating independent of each other in most cases. Developing and establishing continuous workflows in environmental systems analysis integrating observation as well as modelling aspects will help overcoming this deficit. In this paper we present basic concepts of technical workflow developments in geosciences and show examples from different applications in geotechnics. Continuous workflows combine data integration, numerical simulation and data analysis to support the modeling process. Parts of the workflow concept are also demonstrated during the OpenGeoSys training course as a co-event to the conference. The training course is dealing with geothermal systems and salt mechanics.

Profile: Olaf Kolditz

Prof. Kolditz is the head of the Department of Environmental Informatics at the Helmholtz Center for Environmental Research (UFZ). He holds a Chair in Applied Environmental System Analysis at the Technische Universität in Dresden. His research interests are related to environmental fluid mechanics, numerical methods and software engineering with applications in geotechnics, hydrology and energy storage. Prof. Kolditz is the lead scientist of the OpenGeoSys project (www.opengeosys.org), an open source scientific software platform for the numerical simulation of thermo-hydro-mechanical-chemical processes in porous media, in use worldwide. He studied theoretical mechanics and applied mathematics at the University of Kharkov, got a PhD in natural sciences from the Academy of Science of the GDR (in 1990) and earned his habilitation in engineering sciences from Hannover University (in 1996), where he became group leader at the Institute of Fluid Mechanics. Until 2001 he was full professor for Geohydrology and Hydroinformatics at Tübingen University and director of the international Master course in Applied Environmental Geosciences. Since 2007 he is the speaker of the Helmholtz graduate school for environmental research HIGRADE. Prof. Kolditz is Editor-in-Chief of two international journals *Geothermal Energy* (open access) and *Environmental Earth Sciences* (ISI). Prof. Kolditz is the leading scientist of the Sino-German network initiative "Research Centre for Environmental Information Science-RCEIS" dedicated to the development of comprehensive data integration and knowledge platforms in China (funded by the Helmholtz Association, in cooperation with the Chinese Academy of Sciences, Institute for Geographical Sciences and Natural Resources Research) and of the joint priority project "Managing Water Resources in Urban Catchments - Chaohu" linked to the Mega-Water Project (funded by the German Federal Ministry of Education and Research, in cooperation with the Tongji University). Prof. Kolditz was awarded a professorship under the CAS President's International Fellowship (PIFI) in 2015.

William Powrie

Professor, Department of Civil, Maritime and Environmental Engineering, University of Southampton

Invited Lecture Title:

"Climate and vegetation impacts on infrastructure cuttings and embankments"
[Time: Tuesday, 09:30 - 10:00]

Lecture Abstract:

A mature transport infrastructure such as that in the UK is often intensively used, but has key elements that were built without the benefit of a modern understanding of soil mechanics and geotechnical design. Operation of any transport infrastructure network is critically dependent on the performance of such elements, in particular cutting and embankment slopes. In a temperate European climate, seasonal winter wetting and summer drying impose potentially onerous cycles of loading that can precipitate both ultimate and serviceability failures, especially in vegetated slopes. Seasonal shrinkage and swelling of clay fill railway embankments can directly disturb railway track geometry, resulting in train speed restrictions that disrupt normal operations. Very wet winter periods can cause result in slope failures requiring closure of the line for repair and in some cases potentially serious train derailments. As part of an ongoing long-term research programme, observations from field instrumentation are being used to understand how weather and vegetation drive changes in water content and pore water pressure in the earthworks, in turn leading to ground movements. The field observations have also been used to develop and calibrate numerical models able to replicate weather-driven pore water pressure changes and slope failure. The lecture will summarise recent progress, and show how historical and current weather event sequences have been applied using the models developed to understand and assess slope deterioration processes under future climate scenarios up to and including the 2080s.

General Report: Waste mechanics

[Time: Tuesday, 11:30 - 12:00]
The talk will summarise the range of papers received in the general area of solid waste mechanics. Some of the key points and contributions made will be highlighted, and set in the context of previous work to identify emerging challenges for research and practice in this field.

Profile: William Powrie

William Powrie is Professor of Geotechnical Engineering in the Department of Civil, Maritime and Environmental Engineering at the University of Southampton. His main technical areas of expertise are in geotechnical aspects of transport infrastructure, and sustainable waste and resource management. He was elected Fellow of the Royal Academy of Engineering in recognition of his work in these areas in 2009.

William's work on geotechnical aspects of transport infrastructure encompasses groundwater control, in-ground construction to reduce environmental impacts in urban and other sensitive areas, understanding and mitigating vegetation and climate change effects, and fundamental soil behavior.

Krishna Reddy

PhD, PE, BCEE, DGE, FASCE, ENV SP, Professor, University of Illinois, Chicago, USA

Invited Lecture Title:

"Risk, Sustainability and Resiliency Considerations in Polluted Site Remediation"
[Time: Monday, 11:05 - 11:35]

Lecture Abstract:

Environmental pollution including the soil and groundwater contamination has been a major problem faced by the U.S., and many other countries across the world. Realizing the impact contaminated sites had on human health and environment, some of the major environmental regulatory agencies were formed that imposed strict regulations to condemn improper waste disposal practices and to clean up the contaminated sites. Over the years, the environmental regulations and policies have evolved from being ambitious and impractical to a more rational risk-based remediation approach. Several remediation technologies have been developed based on their suitability to different site characteristics. However, the choice of the final remedial technology has always been dictated by its ability to reduce the contaminant concentrations to remedial goals, the cost, and speed of implementation of the technology at the contaminated site. The enormous use of energy and resources by the remediation activities and consequently, the broader environmental impacts that follow from various remediation activities goes unaccounted. In recent years, a more holistic approach, the green and sustainable remediation, involving the quantification of net environmental, economic, and social impacts/benefits (the triple bottom line) of site remediation activities is given great importance to achieve sustainable development. Moreover, with the global climate change and regularly occurring extreme events, it is essential that the remediation plan and design is resilient/adaptable to the extreme events. This study presents an overview of risk-based site remediation approach, and green and sustainable remediation and the tools that aid in quantifying the sustainability of remediation alternatives. In addition, the importance of considering resilient design in remediation projects is discussed. Finally, the challenges and opportunities that needs to be addressed to realize sustainable and resilient remediation are highlighted.

Profile: Krishna R. Reddy

Dr. Krishna R. Reddy is Professor of Civil and Environmental Engineering, the Director of Sustainable Engineering Research Laboratory, and also the Director of the Geotechnical and Geoenvironmental Engineering Laboratory at the University of Illinois, Chicago, USA. Professor Reddy's research expertise includes: (1) environmental remediation of soils, sediments, groundwater, and stormwater; (2) solid and hazardous waste management and landfill engineering; (3) engineering applications of waste/recycled materials; (4) life cycle assessment and sustainable engineering; and (5) geotechnical engineering. He is the author of four books (including the Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies, and the Sustainable Engineering: Drivers, Metrics, Tools, and Applications, both published by John Wiley), 208 journal papers, and 196 conference papers (with h-index 53). Dr. Reddy has given 167 invited presentations in the USA and 18 other countries. Dr. Reddy is the recipient of the ASCE Wesley W. Horner Award, the ASTM Hogentogler Award, the University Distinguished Researcher Award, the University of Illinois Scholar Award, and the University of Illinois Award for Excellence in Teaching. He is a Fellow of the American Society of Civil Engineers, a Board Certified Environmental Engineer, and a Diplomate of Geotechnical Engineering. He is also a registered Professional Civil Engineer and an Envision Sustainability Professional.

Devendra Narain Singh

FNAE, F.ASCE, FICE(UK), Institute Chair Professor, Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, India

Invited Lecture Title:

"Centrifuge Modeling of Contaminant Transport in Geomaterials"
[Time: Monday, 14:40 - 15:10]

Lecture Abstract:

Ever-growing population and unplanned urbanization, in some parts of the globe, have led to contamination of the geoenvironment. To counter this situation, and to remediate the geoenvironment, one of the options is the application of immobilizing agents. However, selection (or sometimes even synthesis) of the most appropriate immobilizing agent is a treacherous task that requires estimation of sorption- and desorption- characteristics of various geomaterials and immobilizing agents. To achieve this, usually 'batch sorption- and desorption- tests' and/or 'column flow-through tests' are conducted. It has been demonstrated by earlier researchers that the column tests simulate 'geomaterial-contaminant-immobilizing agent interaction' in a much realistic way as compared to the batch tests. However, as the hydraulic conductivity of the geomaterials and immobilizing agents, in their compacted form, is quite low, column tests would require a large interaction time to yield appropriate sorption- and desorption- characteristics of these materials. Under these circumstances, and based on the extensive studies conducted by the researchers at IIT Bombay, India, the utility of a geotechnical centrifuge for modeling contaminant transport in geomaterials has been demonstrated successfully and its details are presented in this manuscript.

Profile: Devendra Narain Singh

Dr. D. N. Singh was born in 1965 at Shahjahanpur, UP, India. He has been a faculty member of Civil Engineering at Indian Institute of Technology Bombay, since 1994. Before joining IIT Bombay he has served Central Road Research Institute, New Delhi, and Indian Institute of Technology Kharagpur, for short durations. His early education was completed at Lucknow, UP, India. He obtained his bachelor's, masters and Doctoral degrees from IIT Kanpur in 1986, 1989 and 1993, respectively. His teaching, and research and developmental activities are in quite diversified areas of **geotechnical engineering** (viz., soil mechanics, foundation engineering, environmental geotechnology, mechanics of unsaturated soils, soil characterization based on thermal and electrical properties, contaminant transport in porous media, mineralogical characterization, utilization and recycling of industrial waste, geotechnical centrifuge modeling, etc.). He has published **285** technical articles of which **199** are in the refereed journals. He has supervised **36 Doctoral (and 7 ongoing)** dissertations and **35 Masters** theses. He has been successful in filing **19 (Indian)** and **1 US patents** and **3** have been granted. Dr. Singh has founded ***Environmental Geotechnics***, ICE Publishing, London, UK, and has been its **Editor-in-chief**. He has been 'Editorial Board Member' of several journals of repute. He is recipient of ***Young teachers' award*** instituted by the AICTE, New Delhi and **JUNIOR/SENIOR Paper Award** from the **International Association for Computer Methods and Advances in Geomechanics (IACMAG)** for the year 2005. He was **Chairman, 12th IACMAG, GOA, India, 1-6 October 2008**. He is recipient of **Excellent Contributions Award 2008**, which is given by the IACMAG to individuals who have a record of significant contributions in research, academic activities and professional service in different regions of the globe. He is recipient of **John R. Booker Excellence Award-2011**, which is given by the IACMAG for ***advancement of research, education and practice of Environmental Geotechnology and development of novel techniques to simulate contaminant transport in geomaterials, under laboratory and in-situ conditions.*** He is **recipient of Richard Feynman Prize 2014,** for the best paper published by the **ICE journal.**

Dr. Singh is **Fellow** of:

1. **Indian National Academy of Engineering, New Delhi**
2. **American Society of Civil Engineers (ASCE)** and
3. **Institution of Civil Engineers (ICE), London, UK**

Rainer Stegmann

Prof. Dr.-Ing., Director of Institute of Waste Resources Management (retired)
Hamburg University of Technology, Hamburg, Germany

Invited Lecture Title:

"Development of Landfill Management in the Last 30 Years"
[Time: Wednesday, 09:50 - 10:20]

Lecture Abstract:

Landfilling often is not regarded as a technically and operationally highly demanding waste management option as e.g. incineration. In many cases landfills are seen as a cheap way to get rid of the waste. Mistakes in the design and operation often may become relevant after many years or decades and remediation will be in general become very costly.

Siting, lining and drainage are key factors for the long-term functionality of a landfill. It always has to be kept in mind that these systems have to be operational "forever".

Landfills have to be operated in a way that the biologically degradable waste is degraded in a relatively short time (few decades after landfill closure); by these means the emission potential will be significantly reduced. Measures to reduce the aftercare phase are mechanical- biological pre-treatment and in-situ aeration.

Important part of landfill operation is aftercare and release of a landfill from aftercare. Under which conditions can a landfill be released and does that mean that then no more care will be necessary?

Open questions are also how to deal with high water levels and temperatures in landfills. Another important issue is the question how the bottom drainage system can be kept functional over long periods of time (avoid clogging and collapsing of drain pipes) and in case of damage how they can be repaired or substituted.

Profile: Rainer Stegmann

Prof. Dr.-Ing Rainer Stegmann is a retired Professor of the Hamburg University of Technology in Hamburg, Germany. He holds a Dipl.-Ing. degree in Civil Engineering from the Technical University in Braunschweig, Germany, where he also obtained his doctorate (Dr.- Ing.) degree. In 1982 he became Professor at the Institute of Environmental Science at the Hamburg University of Technology, Germany and from 1991 he was the Director of the Institute of Waste Resources Management.

Rainer Stegmann is one of the founding members of the International Waste Working Group, IWWG, and he is partner of the Consultancy for Waste Management, Prof. Stegmann and Partner in Hamburg, Germany. He published more than 300 papers and edited 5 books.

Contact: stegmann@tuhh.de

Antonio Thome

Professor, Civil and Environmental Engineering Graduate Program, University of Passo Fundo, Brazil

Invited Lecture Title:

"Remediation Technologies Applied in Polluted Soils: New Perspectives in this Field"
[Time: Monday, 11:35- 12:05]

Lecture Abstract:

There are millions of contaminated areas in the world that need to be remediated so that they can be reused without risk to health. It will be presented an amount of contaminated areas in USA, Europe, China and Brazil. The presentation presents the main remediation techniques applied to soils, sediments, and groundwater. These technologies will be presented according the five processes, i.e. physical, chemical, biological, thermal, and combined. The presentation also offers a method for choosing the best technique to remediate a place, called sustainable remediation. An evaluation of the toxicity of remediation techniques is presented. Finally, a summary of remediation practice in China is discussed, and the main challenges of future remediation research are presented.

Profile: Antonio Thome

PhD in Civil Engineering (Geotechnics) from Universidade Federal do Rio Grande do Sul-Brazil. Completed a post-doctorate at the University of Illinois at Chicago-USA, in the area of remediation of soils and groundwater. Professor and Researcher at the University of Passo Fundo in the Graduate Program in Civil and Environmental Engineering, and the Graduate Program in Environmental Sciences. Has approximately two hundred articles published in journals and conferences in the area of Geotechnics. Works as a Geotechnical Consultant for the company Infra-Geo Engineering, Geotechnics and Environmental. Is currently Vice-Rector of Research and Graduation at University of Passo Fundo (2018-2022), President in his state of the Brazilian Society of Soil Mechanics and geotechnical engineering, representative of Brazil on the Technical committee TC215 (Environmental Geotechnics).

Fuming Wang

Laboratory director of National Engineering Laboratory of Detection and Maintenance Technology of Major Infrastructures
Director of Henan Co-innovation Center of Water and Transportation Infrastructure Security

Invited Lecture Title:

"The Development of Impermeable Technology in Underground Engineering"
[Time: Monday, 16:00 - 16:30]

Lecture Abstract:

With the rapid development of water conservancy, transportation and the municipal engineering infrastructure and a large number of aged disrepair project, engineering safety become significantly important relating with people's lives and property security. Leakage, water gushing, subsidence, collapse and other unexpected disasters caused heavy losses and social influence. The traditional excavation and maintenance methods affected traffic, wasted resources and polluted environment, which already cannot satisfy the urgent demand of our country's infrastructure maintenance. **The content of this topic is Non-water reacted polymer grouting material properties, Non-water reacted polymer grouting material propagation mechanism, Diseases treatment technology, Flexible anti-seepage wall technology, Impermeable and seismic isolation technology & Malleable recoverable support technology.** The technology has applied in the middle line of South to North Water Transfer Project, the Yellow River embankment, the Suzhou River embankment, the Anxin Section in Beijing-Hong Kong-Macao Expressway, Yesanguan Tunnel in Yi-wan Railway, underground pipes in Guangzhou City and more than 300 projects, which have significant economic and social benefits.

Profile: Fuming Wang

Wang Fuming was born on March, 1957 at Henan Province. He graduated from Dalian University of Technology with doctoral degree in 1987. In 1996, he was awarded National Science Fund for Distinguished Young Scholars. Currently, he is the laboratory director of National Engineering Laboratory of Detection and Maintenance Technology of Major Infrastructures, the director of Henan Co-innovation Center of Water and Transportation Infrastructure Security. His academic work includes the president of Chinese Non-excavation Technology Council, the Committee Member of Water Conservancy Engineering, the Expert Group Member in the field of Modern Transportation Technology.

Prof. Wang engaged in security maintenance theory and research of infrastructure in long time and have systematic achievements in aspects of water seepage prevention and control, the diagnose and treatment of hidden diseases. Prof. Wang was awarded the Second Prize of National Technology Patents once, the Second Prize and Third Prize of National Award for Science and Technology Progress once, respectively, International Academic Research Award of Non-excavation and Henan Province Outstanding award of Science and Technology. He was elected as the academician of Chinese Academy of Engineering in 2015.

Liang Chen

Ph.D. Senior Engineer, Deputy Director of High-level Radioactive Waste Disposal Division of BRIUG

Invited Lecture Title:

"Progress of High-level Radioactive Waste Disposal Program in China"
[Time: Tuesday, 09:00 - 09:30]

Lecture Abstract:

With the rapid development of nuclear power in China, the disposal of high-level radioactive waste (HLW) becomes an important issue to the nuclear safety and environment protection. Deep geological disposal is internationally accepted as a feasible and safe way to dispose of HLW, and underground research laboratories (URLs) play an important and multi-faceted role in the development of HLW repositories. A three-step strategy is adopted in China for the HLW disposal program, namely the siting, the URL studies and the repository construction. In the presentation, the latest progress of siting process and URL project in China will be introduced. Based on the proposed strategy to build an area-specific URL, the Xinchang site in the Beishan area, located in Gansu Province of northwestern China, has been determined as the final site for China's first URL in granite. Since 2015, a series of investigations and tests have been conducted to characterize the deep geological, hydro-geological and mechanical properties of the site. Based on the achievements obtained from the characterization of the URL site, a preliminary design of the URL, which is a facility at a depth of 560 m below the ground surface, is proposed and in-situ tests to be carried out in the URL are planned.

Profile: Liang Chen

Dr. Chen obtained his Ph.D. in Civil Engineering from the University of Sciences and Technologies of Lille (USTL, France) in 2009. In September 2010, he became an associate professor in the Central University of Nantes in France. Dr. Chen returned to China and joined Beijing Research Institute of Uranium Geology (BRIUG) in 2011, working on the geological disposal program for High-Level Nuclear Waste in China. Now, he is the deputy director of High-level Radioactive Waste Disposal Division of BRIUG, responsible for international cooperation and R&D activities.

Charles Shackelford

Professor, Colorado State University, Fort Collins, Colorado, USA

General Report: Pollutant Transport

[Time: Tuesday, 11:00 - 11:30]

The presentation provides an overview of the 18 conference papers focused on Transport, Persistence and Fate of Pollutants and the 38 conference papers focused on Engineered Barriers. The papers will be categorized and summarized with respect to the primary content of the paper, and selected papers of particular interest will be described in more detail. The presentation should assist the audience in deciding which papers may be of interest for a more detailed review.

Profile: Charles D. Shackelford

Charles D. Shackelford is Professor and Head of the Department of Civil and Environmental Engineering, Colorado State University, Fort Collins, Colorado, USA. He has 35 years of experience pertaining to the geoenvironmental aspects of waste management and environmental remediation, and has served as an expert on waste disposal issues on numerous occasions for private companies and federal agencies. Dr. Shackelford's research is focused primarily on evaluating flow and transport of hazardous liquids and contaminants through soil and geosynthetic containment barriers, such as compacted clay liners (CCLs) and geosynthetic clay liners (CCLs), commonly used in geoenvironmental containment applications, as well as through soil-bentonite (SB) vertical cutoff walls used for in situ control and containment of polluted groundwater.

ISSMGE Bright Spark Lectures

Marta Di Sante

Researcher at SIMAU Department in UNIVPM, Italy

Lecture Title: "The Reuse of Excavated Soil by Lime Stabilization: Mechanical and Hydraulic Properties"

Profile: Marta Di Sante graduated *cum laude* in Environmental Engineering at Università Politecnica delle Marche (UNIVPM, Ancona - Italy) in 2006 with a thesis in geotechnical engineering. She received the Ph.D. degree in 2010 with a dissertation on lime stabilized soil. She continued to develop research activity with Post-DOC grants, also dealing with polluted sites management, studying contaminants migration and risk assessment procedures. Now she is researcher at SIMAU Department (UNIVPM). She authored 38 publications (mainly international) that include papers in scientific journals as well as chapters in scientific books and reviewed papers for renown scientific journals. She lectured at Ground Improvement course for Civil Engineering At UNIVPM and at professional training courses. She participated to scientific congresses concerning Environmental Geotechnics.

Xunchang Fei

Assistant Professor at Nanyang Technological University, Singapore

Lecture Title: "Changes in Static and Dynamic Responses of Municipal Solid Waste in Landfills due to Long-term Coupled Degradation Processes"

Profile: Xunchang Fei obtained his bachelor degree and doctoral degree from Tongji University and the University of Michigan at Ann Arbor, respectively. He worked as postdoctoral researcher at the University of Michigan and King Abdullah University of Science Technology between 2016 and 2018. He is an assistant professor at Nanyang Technological University in Singapore. His research interests are 1) smart solid waste management and treatment; and 2) sensing and monitoring of coupled processes under subsurface and below-seafloor conditions. He has secured around $250,000 of research funding as a Principle Investigator. He has published more than 20 journal papers and conference proceedings in the field of waste management, geoenvironmental engineering and environmental molecular biology.

Wenjie Xu

Lecturer at Zhejiang University, China

Lecture Title: "A multi-field coupling model of degradable soils and its applications in landfilled municipal solid waste"

Profile: Dr. Wenjie Xu is assistant researcher in the institute of geotechnics at Zhejiang University. He obtained the PhD degree in Dresden University of Technology in Germany. Between 2010 and 2013 he worked as assistant researcher at the German Federal Institute of Geosciences and Natural Resources (BGR). From 2014 to 2017 he worked as post-doctoral fellow at Zhejiang University. His research interests focus on the coupled processes in prose/fractured media in geoenvironmental engineering and the geo-centrifuge modeling experiment. He has published more than 10 Journal papers in the field of radioactive waste geological disposal and municipals solid waste landfill.

Junjun Ni

Postdoctoral Researcher at Hong Kong University of Science and Technology

Lecture Title: "Hydrological contribution of vegetation to slope stabilization: theory and experiment"

Profile: Dr. Ni Junjun received his doctoral degree in 2017. During his Ph.D. study, his research was about the application of vegetation on slope stability and landfill cover. His research revealed the importance of hydrological reinforcement of plants on slope stability considering the effects of planting spacing and mixed plant types. During his research, he became experienced with full-scale field tests, small-scale laboratory tests and theoretical modelling. Around ten journal papers were published/submitted during his Ph.D. studies, including Géotechnique, Canadian Geotechnical Journal, and Computers and Geotechnics.

CONCURRENT SESSIONS

13:30-15:20 Tuesday Oct. 30 2018

Engineering Barriers Ⅰ

Chairs: Gemmina Di Emidio, Yonggui Chen
Room: Xixi I

Equivalent Design and Evaluation of the Liner System for A Hazardous Waste Landfill Vertical Expansion

Xuede Qian* (USA), Te-Yang Soong, Xianda Zhao, Hang Shi

Chemical compatibility of CMC-treated bentonite under heavy metal contaminants and landfill leachate

R.-D. Fan, S.-Y. Liu, Y.-J. Du* (USA), Krishna R. Reddy, Y.-L. Yang

Modeling Solute Transport through Geosynthetic Clay liners permeated with inorganic solutions

Francesco Mazzieri* (Italy), Evelina Fratalocchi

Impact of Heavy Metals On The Consolidation Properties of Bentonite

Saswati Ray* (India), Bismoy Roy Chowdhury, Anil Kumar Mishra, Ajay Kalamdhad

Effects of soil fabric on the thermal expansion coefficient of clay with reference to the crack formation in landfill barriers

Q. Y. Mu* (China), C. W. W. Ng, C. Zhou, H. J. Liao

Identifying active methanotrophs and mitigation of CH4 emission in engineered landfill biocover

Raksha K. Rai* (USA), Jyoti K. Chetri, Stefan J. Green, Krishna R. Reddy

Influence of pore distribution characteristics on relative hydraulic conductivity in soil covers—a pore-scale numerical investigation

Guangyao Li* (China), Liangtong Zhan, Sheng Dai

Prediction of Vegetation-Induced Soil Suction using Numerical Modelling and AI

M. Indu Priya, Ankit Garg, S. Sreedeep, Ajit Sarmah, Nik Norsyahariati Nik Daud* (Malaysia)

Study on soil-water characteristic curves of unsaturated silty clay of an old landfill cover

Zhan-hong Qiu, Zan-cheng Zhu, Qiao Wang Hai-jian Xie* (China), Chenxi Zhao

Testing of leachate levels at a landfill with multiple intermediate covering layers

Haijie He, Jiwu Lan* (China), Yunming Chen, Pengcheng Ma

Effect of initial compaction state on erosion potential for cover liner

Himanshu Kumar, Sanandam Bordoloi, S. Sreedeep, Ankit Garg* (China)

Contaminated Land and Remediation Technology Ⅰ

Chairs: Fei Jin, Yanjun Du
Room: Xixi II

Sorption kinetics used in design calcite permeable reactive barrier

Daichao Sheng* (Australia)

Laboratory study of the detection of metal contaminated clay layer using four-electrode resistivity cone

Ya Chu, Songyu Liu* (China), Guojun Cai, Hanliang Bian, Lei Xu

Syntheses and characterization of Titanium encapsulated Alumino-Silicate Microspheres (TiAS300/500): Promising materials for the removal of azo dyes from groundwater

Venkataraman Sivasankar* (Japan), Kiyoshi Omine

Breakthrough curve modelling of ZSM-5 zeolite packed fixed-bed columns for the removal of MTBE

Yunhui Zhang* (UK), Fei Jin, Zhengtao Shen, Rod Lynch, Abir Al-Tabbaa

Self-powered redox fuel cell as feasible permeable reactive barrier for the removal of phenol

Binbin Yu, Wei Xu, Xu Yang, Huimin Zhang, Zheng Fan, Zucheng Wu* (China)

In-situ generation of active oxidants in permeable reactive barriers

Xu Yang, Jingbo Yang, Qinhai Hu, Min Xia, Zucheng Wu* (China)

Experimental study on influencing factors of soil vapor extraction in toluene-contaminated sandy soils

Bai-Yang Mao, Zhi-bin Liu* (China), Song-Yu Liu, Qi-Bing Wei

Remediation of TCE contaminated site by ozone micro-nano-bubbles

Zhiran Xia, Liming Hu* (China), Shusaku Kusaba, Dejun Song

Enriching Indigenous Ureolytic Bacteria in Coastal Beach Sand

Yi-Jie Wang, Xiao-Le Han, Ning-Jun Jiang* (USA)

Toxicity evaluation of nano-zero valent iron to soil indigenous microorganisms

Iziquiel Cecchin* (Brazil), Eloisa Fernanda Tessaro, Cleomar Reginatto, Antonio Thomé, Krishna R. Reddy

Landfills of Solid Wastes Ⅰ

Chairs: Ningjun Jiang, Jianyong Shi
Room: Xixi III

Slope Stabilization and Capacity Expansion at Tianziling Landfill in Hangzhou, China

Liangtong Zhan, Jiwu Lan* (China), Wei Li, Yunmin Chen

Cyclic Simple Shear Testing of Degraded Municipal Solid Waste from California under Constant Volume and Constant Load Conditions

Xunchang Fei* (Singapore), Dimitrios Zekkos

A New Consolidation Model for Unsaturated High-kitchen-waste-content MSW

Ke Li, Wenjie Xu* (China), Yunmin Chen

Model uncertainties in long term settlement prediction of landfill waste

Yuekai Xie* (Australia), Jianfeng Xue, Carthigesu T. Gnanendran

Landfill Storage Capacity Analysis Method by Considering Foundation Settlement and Its Application

Hai-Long Liu* (China), Zhuo-Fei Wu, Yu-Chao Li

Laboratory measurements of K0 of municipal solid waste

Pengbo Yuan* (China), Edward Kvazanjian Jr, Wenwu Chen

Triaxial Tests to characterize the shear strength behavior of Mechanical-Biological-Treated Waste in Hangzhou, China

Zhenying Zhang* (China), Wenqiang Guo, Yingfeng Wang, Yuxiang Zhang, Hui Xu, Dazhi Wu, Kaifu Liu

Research on water retention characteristics and pore size distribution of landfilled municipal solid waste

Wenjie Zhang* (China), Lu Lv

A Constitutive Model for the Stress-Strain-Time Behavior of Municipal Solid Waste

Wu Gao* (China), Edward Kavazanjian Jr

Municipal Solid Waste Disposal in Hangzhou, China

Xiao Bing Xu* (China), Da Ni, Si Fa Xu, Ji Wu Lan, Hui Xu

Improving the Slope Stability of Municipal Solid Waste Dumps using Reinforced Soil Berms: A Case Study

A. Agarwal* (India), M. Datta, G. V. Ramana, R. Satyakam

Impact of moisture mobility on compression characteristics of MSW through soil structure measurements

M. V. Shah* (India), Abhijit J. Brahmbhatt

Geotechnical Recycling and Reuse of Waste Materials I

Chairs: Antonio Jose Roque, Abraham C. F. Chiu
Room: Xiyuan III + IV

Application of soil improvement material using recycled gypsum considering the environmental safety

Kenichi Sato* (Japan), Takuro Fujikawa, Chikashi Koga

Effects of lime stabilization on hydraulic behavior of Finnish soft sensitive clays

M. Di Sante* (Italy), F. Giorgetti, B. Di Buò, T. Länsivaara, E. Pasqualini

Geotechnical Parameters of Mixtures of a Tropical Soil with Water Treatment Sludge

Edy L. T. Montalvan* (Brazil), Maria E. G. Boscov

Study on three-dimensional micro-porosity of solidified sludge under biodegradation based on ArcGIS technology

Lei Li* (China), Jinxiang Yi

A Rheological Approach for the Evaluation of Geotechnical Use of Water Treatment Sludge

Juliana K. Tsugawa* (Brazil), Roberto C. de O. Romano, Rafael G. Pileggi, Maria Eugenia G. Boscov

Engineering Performance and its Mechanism of Expansive Soils Modified by Adjusted and Activated Steel-Slag

Jun Wu, Qianwen Liu, Yongfeng Deng* (China), Qi Feng

Evaluation and optimization of the granulated blast furnace slag-natural sand mixture hardening properties

Tomomi Sakata* (Japan), Noriyuki Yasufuku, Ryohei Ishikura

Evaluation of Environmental Safety on Municipal Solid Waste Incineration Bottom Ash using Aging Method

Takuro Fujikawa* (Japan), Kenichi Sato, Chikashi Koga, Hirohumi Sakanakura

Feasibility of Reuse of Bottom Ash from MSW Waste-to-Energy Plants in India

Garima Gupta* (India), Manoj Datta, G. V. Ramana, B.J. Alappat, Shashank Bishnoi

Lead Adsorption by Biomass and Weathered Coal Fly Ashes

Xenia Wirth* (USA), N. N. Nortey Yeboah, Susan Burns

Experimental study on mix proportioning methodology for porous ecological concrete

Y. Zhuang* (China), H. L. Xiao

Stabilization/Solidification of Ladle Slag in Cement-stabilized Clay

Bo Xu, Kimberly Sze Ern Yeap, Yaolin Yi* (Singapore)

Transport, Persistence and Fate of Pollutants Ⅰ

Chairs: Kristin Sample-Lord, Hefu Pu

Room: Boardroom
Experimental study of the factors influencing heptane volatilization from sands
Qibing Wei, Zhibin Liu* (China), Songyu Liu, Yi Wang, Boyan Mao, Feng Liu
Column Percolation Tests for Evaluating the Leaching Behavior of Marine Sediment Containing Non-anthropogenic Arsenic
Toru Inui* (Japan), Mutsumi Hori, Atsushi Takai, Takeshi Katsumi
Semi-analytical model for methane transport and oxidation through landfill compacted clay liner (CCL) cover
Qiao Wang, Jiawei Wu, Haijian Xie* (China)
A non-equilibrium adsorption model based on irreversible thermodynamics
Zhihong Zhang* (China), Wenlong Qin, Jiapei Zhang, Zhaogang Xu, Fei Guo
Benchmarking of FEHM Control Volume Finite Element Solver
M. D. Fredlund* (Canada), Shawn Meng, George A. Zyvolosk, Philip H. Stauffer, Shlomo Orr
Lead adsorption on rice husk as a function of pH control
Paulo Scarano Hemsi* (Brazil), Diego Diez Garcia
Experimental study on two-dimensional hydrodynamic dispersion of soluble pollutants in soil
Liang Chen* (China), Jianjian He, Haixing Hu
Changes in swelling pressure and permeability of bentonite caused by ion exchange of montmorillonite
Yasutaka Watanabe* (Japan), Shingo Yokoyama
Accumulation of ammonia via electrodeionization barrier for the groundwater denitrification
Xiao Feng, Xu Yang, Wen Liao, Qiong Ren, Haoyue Zheng, Zucheng Wu* (China)
Adsorption of Cadmium from Aqueous Solutions onto Activated Carbon and Recycle Materials
Xiaofeng Liu, Xin Xu, Xiaoqiang Dong* (China), Junboum Park* (Korea)

15:50-17:40 Tuesday Oct. 30 2018 Engineering Barriers Ⅱ
Chairs: Everlina Fratalocchi, Chenghua Wang Room: Xixi I
Enhanced sustainable soils: a review
G. Di Emidio* (Belgium), J. Meeusen, D. Snoeck, R. D. Verastegui Flores
Phenomenological analysis and physical interpretation of the reflection coefficient of clays
Andrea Dominijanni* (Italy), Nicolò Guarena, Mario Manassero
Assessment of Backfill Hydraulic Conductivity in an Instrumented Soil-Bentonite Cutoff Wall
Landon C. Barlow* (USA), Michael A. Malusis
Estimation of vertical barrier performance based on microbial improvement
Yu Zhang, Lingling Pan, Wang Fei, Zhu Ning, Qiang Tang* (China)
Applications of Geomembrane Cutoff Walls in Remediation of Contaminated Sites
Xuede Qian* (China), Zhonghua Zheng, Zhi Guo,Changqing Qi, Liqi Liu, Yong Liu, Shengli Zhen, Shiwen Ding, Jing Jin, Yang Wang, Yimin Ge
Vane shear strength tests to evaluate in situ stress state of a Soil-Bentonite Slurry Trench Wall

Jeffrey C. Evans* (USA), Yu-Ling Yang, Daniel G. Ruffing

Analysis of consolidation processing of piezocone penetration test in cutoff wall

Xuepeng Li (China), Guojun Cai, Songyu Liu, Yuchao Li

Accumulated vertical strain without confining pressure for compacted bentonite due to hydration effort

Tomoyoshi Nishimura* (Japan), Junichi Koseki

Sorption of Lead to Slurry Trench Cutoff Wall Backfills Comprised of SHMP-Amended Ca-Bentonite

Yu-Ling Yang, Krishna R. Reddy, Yan-Jun Du* (China), Ri-Dong Fan

Hydraulic Conductivity of Soil-Bentonite Cutoff Walls Constructed at the Ground Containing Cement Stabilized Soil

Atsushi Takai* (Japan), Kazuki Yamaguchi, Toru Inui, Takeshi Katsumi

Evaluation of Hydraulic Conductivity of Lateritic Soil Treated with Bacillus Coagulans for Use in Waste Containment Applications

K. J. Osinubi, P. Yohanna, A. O. Eberemu* (Nigeria), T. S. Ijimdiya

Contaminated Land and Remediation Technology Ⅱ

Chairs: Jeffrey C. Evans, Liming Hu
Room: Xixi II

Phosphorus Speciation of Sediments of a Mesoeutrophic Lake in Quebec, Canada

Dileep Palakkeel Veetil, Catherine N. Mulligan* (Canada), Sam Bhat

Effect of KMP Stabilization on Chemical Properties of a Heavy-metal Contaminated Site Soil

Wei-Yi Xia, Yan-Jun Du* (China), Martin D. Liu, Ya-Song Feng, Yu-Ling Yang

Performance evaluation of stabilised/solidified contaminated model soil using PC-based and MgO-based binders

Fei Wang* (China), Zhengtao Shen, Haibo Yu

Solidification/stabilization (s/s) of high concentration of zinc contaminated soils using soda residue

Fusheng Zha, Jingjing Liu, Yongfeng Deng, Long Xu* (China), Xiangyang Wang, Xiuhong Yang

Identification of potentially contaminated sites in a medium-sized Brazilian city

G. B. Rampanelli* (Brazil), D. B. Balestrin, A. Thomé

Study on the Characteristics of Heavy Metals Concentrated in the Native Plants of Jinchuan Mining Area

Guo-hua Chang, Tian-peng Gao* (China), Qing Zhang, Ying-quan Chen, Xi-sheng Tai, Ming-kai Chen

Numerical Investigation on Utilization of Natural Contaminated Soil in the Embankments

Feyzullah Gulsen* (Japan), Toru Inui, Tomohiro Kato, Atsushi Takai, Takeshi Katsumi

Stabilization of Tropical Peat Using Liquid Polymer

Nima Latifi, Sumi Siddiqua* (Canada), A. Marto

Environmental Site Assessment at TPH Contaminated Site: A Malaysian Case Study.

Wan Zuhairi Yaacob* (Malaysia), Abdul Rahim Samsudin, Mohd Raihan Taha, Ahmad Nazri Saidin, Shahril Husin

Landfills of Solid Wastes Ⅱ

Chairs: Toru Inui, Zhenying Zhang
Room: Xixi III

Incorporating Thermal Effects in Modeling of MSW Landfills

Girish Kumar* (USA), Kevin Kopp, Krishna R. Reddy, James L. Hanson, Nazli Yeşiller

Temperature variation under the consideration of convection and heat generation in landfills

Hao Lei* (China), Jianyong Shi, Xun Wu

Leachate Properties of the Stabilized MSW Incineration APC Residues in Pilot-scale Mono-Landfill

Junjie Qiu, Hua Zhang, Siyuan Yu, Liming Shao, Pinjing He* (China)

Effects of Leachate Concentration(Na+、Pb2+、COD) on Non-Darcy Flow of Compacted Clay

Shengwei Wang* (China), Wei Zhu, Haoqing Xu, Shi Shu, Xihui Fan

Installation and performance of horizontal wells for leachate level control in Tianziling MSW landfill, China

Jie Hu* (China), Han Ke, Zu Yu Chen, Ji Wu Lan, Liang Tong Zhan, Yun Min Chen

Geotechnical engineering properties of solidified sludge in Qizishan Landfill Site，China

Weian Lin* (China), Kaixi An, Yunmin Chen, Liangtong Zhan

Investigation of construction and demolition waste, a case study in Deqing, China

Min Xia, Shuai Zhang, Liangtong Zhan* (China)

The key problem in aeration project and it's plan optimization

Lei Liu* (China), Jun Ma, Xin Min Nan Hui, Yi Dong, Sai Ge

Methane Oxidizing Bacteria and Its Potential Application of Methane Emission Control in Landfills

Wenjing Sun, Xiaoyang Liu, Xueping Chen* (China)

Pozzolanic properties of municipal solid waste incineration (MSWI) fly ash under the actions of three different activators

Ping Chen, Xiao-qing Ding, Hao Zheng, Hui Xu* (China)

Experimental study on the compression and pore characteristics of undisturbed loess polluted by landfill leachate

Shicheng Xu, Haijun Lu* (China), Dinggang Li, Jixiang Li, Weiwei Wang

Stability Enhancement of Landfills on Sloping Ground Using Earthen Berms at the Toe

Abinash Mahanta* (India), Manoj Datta, Gunturi Venkata Ramana

Geotechnical Recycling and Reuse of Waste Materials Ⅱ

Chairs: Maria E. G. Boscov, Yufeng Gao
Room: Xiyuan III + IV

Adsorption Models of Groundwater Remediation by Nanoscale Zero Valent Iron

Dantong Lin, Zifu Zhang, Liming Hu* (China)

Combination of porous ecological concrete and geocell in riverbank protection

Y. Zhuang* (China), H. L. Xiao

Influence of TDA as Alternative Fine Aggregates on Engineering Properties of Low Strength Concrete

Zhaohui Li* (China), Jianxun Shi, Mingqiang Wei, Junjie Xuan

Management of the soils discharged from shield tunnel excavation using information and communication technology

Muneyuki Yamana* (Japan), Yasuo Tomizawa, Teruyuki Fujiwara, Kazuma Mizuta, Katsumi Mizuno, Toru Inui, Takeshi Katsumi, Masashi Kamon

Recycling application of the construction waste in silt subgrade: A Case study

Xin Jin, Haoran Zhu, Yongfeng Deng* (China), Qi Feng

Effect of adsorbent dosage to adsorbate concentration ratio on the adsorption of cd(II) on coal gangue

Zili Tang, Hui Wu, Qingbo Wen, Liming Hua* (China)

Status and Opportunities for Materials Recovery from Municipal Solid Waste in Kathmandu Valley, Nepal

Dhundi Raj Pathak* (Nepal), Bandita Mainali

Consolidation of dredged sediments in a confined disposal facility: hydraulic conductivity constitutive relations

Mirko Felici* (Italy), Jonathan Domizi, Evelina Fratalocchi

Experimental Research on Recycled Concrete Road Base of Geopolymer Technology

Y. Zhuang* (China), H. L. Xiao

Experimental Study on Recycling of Waste Concrete Based on Geopolymer Technology

Zhi Duo Zhu, Su En Gu* (China), Zhen Tang, Lei Song

Effect of crumb rubber on the mechanical properties of crushed recycled pavement materials

Mohammad Saberian, Jie Li* (Australia)

Influence of biochar obtained from invasive weed on infiltration rate and cracking of soils: An integrated experimental and artificial intelligence approach

Phani Gopal, Raval Ratnam, Muhammad Farooq* (India), Ankit Garg, Nirmali Gogoi

Transport, Persistence and Fate of Pollutants Ⅱ

Chairs: Andrea Dominijanni, Linchang Miao
Room: Boardroom

Modelling impact of biomass growth on flow regimes in porous media

Peter Cleall* (UK), Jose J. Munoz-Criollo, Michael Harbottle

Development of a High-density Electrical Resistivity Tomography (HERT) system for monitoring model-scale seepage and solute transport

Tingfa Liu, Yanxia Nie, Liming Hu* (China), Qiyuo Zhou, Qingbo Wen

Identification of Processes and Migration Parameters for Conservative and Reactive Contaminants in the Soil-Water Environment

Anna Sieczka* (Poland), Eugeniusz Koda, Anna Miszkowska, Piotr Osiński

Salt Diffusion through Sodium Bentonite and Bentonite Polymer Composite

Shan Tong, Kristin M. Sample-Lord* (USA), Gretchen L. Bohnhoff, Andrew B. Balken

Analysis of the Cause of Formation of Free Phase LNAPL under Hydrodynamic Interference

Honglei Zhou* (China), Suyun Chen, Feng Wang, Chuan Du

Correction of the Seepage Velocity of Soluble Contaminants in Sand with Different Particle Size Distribution

Liang Chen, Chongwu Lei* (China), Chunmu Luo, Yueqi Li

Extrapolating Kd or Rd from breakthrough curves of cesium cations transporting through a soil column

Xiao Chen, Guan-Nian Chen, Bate Bate* (China), Yuchao Li

Physical Modelling of Mitigating Methane Emission from Biochar Modified MSW Landfill Cover

Abraham C. F. Chiu* (China), Y. Xiao

How to Perform Hydraulic Conductivity up Scaling in the Daily Practice of Geotechnical Modeler?

Vanessa A. Godoy* (Brazil), Lazaro Valentin Zuquette, J. Jaime Gómez-Hernández

13:20-15:00 Wednesday Oct. 31 2018

Engineering Barriers III

Chairs: Francesco Mazzieri, Yuchao Li

Room: Xixi I

Multiscale Research on Gas Migration Properties in Bentonite Barrier for Radioactive Waste Disposal

Hong-Yang Ni, Jiang-Feng Liu, Jing-Na Guo, Xu-Lou Cao, Shuai-Bing Song, Jiang-Feng Liu* (China)

Hydraulic conductivity and sorption capacity of special barrier materials in inorganic solutions

Evelina Fratalocchi* (Italy), Jonathan Domizi, Francesco Mazzieri

Hydraulic conductivity of modified bentonites after wet and dry cycles

Ms. De Camillis* (Belgium), G. Di Emidio, A. Bezuijen, R. D. Verastegui Flores

Inducing Hydrophobicity to Improve Long Term Performance of Kaolinite Clay

Aisha M. S. Haquie* (USA), Megan L. Hart

Influence Factors of Swelling Characteristics of GMZ Bentonite

Yufeng Gao* (China), Yuemiao Liu, Jingli Xie, Shengfei Cao, Like Ma, Qiang Tong

Laboratory investigation of anisotropic shrinkage of HLW buffer block: An attempt using digital image correlation method

Huyuan Zhang* (China), Yu Tan, Dongjin He, Gang Luo

A simplified third-type inlet boundary condition solution for contaminate transport through slurry cut-off walls

Guan-Nian Chen, Yu-Chao Li* (China), Han Ke

Influences of Effective Confining Stresses on the Chemical Compatibility of Backfills for Soil-Bentonite Cutoff Walls

Haoqing Xu* (China), Wei Zhu, Shengwei Wang, Shi Shu, Xihui Fan

Synthesis and characterization of geopolymers from coal gangue, fly ash and red mud

Kunga Dondrob, Nevin Koshy, Qingbo Wen, Liming Hu* (China)

Unsaturated hydraulic conductivity of compacted bentonite – Revisit of microstructure effects

Tian Chen, Majid Sedighi* (China), Andrey Jivkov, Uresh C. Seetharam

Contaminated Land and Remediation Technology III

Chairs: Michael Harbottle, Zhihong Zhang

Room: Xixi II

Hazardous Waste Dumped on the Spoils of an Old Coal Mine (Portugal) – Environmental Rehabilitation of the Site for Reuse

Antonio Jose Roque* (Portugal), Vitor Monteiro

Estimation of oil-contaminated soils' mechanical characteristics using electrical resistivity

Hanliang Bian, Songyu Liu* (China), Ya Chu, Guojun Cai

Application of Resistivity CPTU in Evaluating Contaminated Site in Shanghai

Cong Yan, Guojun Cai* (China), Xuepeng Li, Min Chen, Songyu Liu, Xinrong Miao, Jun Lin, Hanliang Bian

Broadband Complex Dielectric Characterization of Soils by Time Domain Reflectometry

Yin Jeh Ngui, Chih-Ping Lin* (Taiwan China)

Temporal ground penetrating radar (GPR) imaging of an oil release within a porous medium: a description of anomalous GPR characteristics during the degradation process and a contaminated area determination method

Shuai Shao, Xiujun Guo* (China), Hao Ding

Phytoremediation of Field Soil with Mixed Contamination

Krishna R. Reddy* (USA), Reshma A. Chirakkara

Phytoremediation of Light Non-Aqueous Phase Liquids

Sunday Oniosun, Michael Harbottle* (UK), Snehasis Tripathy, Peter Cleall

Physicochemical treatment of dredged clay slurry waste for land reclamation purpose

Rong-jun Zhang, Chao-qiang Dong, Jun-jie Zheng* (China)

The effects of temperature on hydraulic conductivity of remolded sewage sludge

Wei-an Lin* (China), Pei Zhang, Liang-Tong Zhan, Kai-Xi An, Xin-jie Zhan

Study on the Cleaning of Organic Pollutants by Micro-nanoBubbles in Sandy Soil Foundation

Ying Liu* (China), Han Ke, Bate Bate, Xiaowu Wen

Effect of Na+ on removal behaviors of heavy metals from contaminated silty soils flushed by EDTA

Yan Wang* (China), Jiadong Wen, Keke Li, Yiting Jin

Landfills of Solid Wastes III

Chairs: Ernest Olinic, Chuang Yu

Room: Xixi III

Effect of landfill odorous gas on surrounding environment: a field investigation and numerical analysis in a large–scale landfill in Hangzhou, China

Siliang Shen, Qiao Wang, Yunmin Chen, Xinru Zuo, Feiyu He, Shuangke Fei, Haijian Xie* (China)

Balance between Cover Resistance and Pump Capacity for Designing Vertical Gas Well

Qi-Teng Zheng, R. Kerry Rowe, Shi-Jin Feng* (China)

Influence of Atmospheric Pressure on Methane Emissions from Earthen Landfill Covers

T. Wu* (China), L. T. Zhan

Landfilling of Oil and Gas Exploration and Production Wastes: Geotechnical and Environmental Considerations

Ricardo C. de Abreu* (USA), Jonathan E. Fourrier

Dependency of Landfill Gas Generation Parameters on Waste Composition Based on Large-Size Laboratory Degradation Experiments

Sampurna Datta* (USA), Dimitrios Zekkos

Numerical simulation of bioreactor landfills subjected to aeration using CFD

An-Zheng Li* (China), Shi-Jin Feng, Ben-Yi Cao

Opening of an environmentally friendly landfill of non-hazardous industrial waste as support for closing an uncontrolled waste landfill

Ernest Olinic* (Romania), Tatiana Olinic

Seashore MSW landfill using drainage layer and thick soil cover—Leachate containment and post-closure land use

N. Maeda* (Japan), J. Tsukahara, K. Endo, M. Kamon, T. Katsumi

Measuring soil strain using fibre optic sensors

Susanga Costa* (Australia), Gayan Kahandawa, Jian Chen, Jianfeng Xue

Application of Geosynthetics in Geo-environmental Engineering Ⅰ

Chairs: Chih-Ping Lin, Haijian Xie
Room: Xiyuan III + IV

Effect of consolidation on VOC transport through a GM/GCL composite liner system

Hefu Pu*(China), Charles D. Shackelford, Patrick J. Fox

Effect of GCL on Moisture and Temperature Fields of Highway Subgrade through Numerical Analysis

Feng Liu, Zhibin Liu* (China), Feng Yin, Shujian Zhang, Yi Wang

A review of experimental and prediction methods for assessing the freezing characteristic curve of GCLs

G. G. Carnero-Guzman* (Australia), A. Bouazza, W. P. Gates, R. K. Rowe

Failure mechanism of two-stage mechanically stabilized earth walls on soft ground

Xu Zhang, Jianfeng Chen* (China), Junxiu Liu

Resiliance of Australian polymer-modified powdered sodium bentonite geosynthetic clay liners to downslope bentonite erosion

Will P. Gates* (Australia), Daniel Gibbs, Marc Amstberg

Experimental study of shear strength of geosynthetic clay liner for monotonic loading

Jiyun Chang* (China), Shijin Feng, Yang Shen, Hao Shi, Jialiang Shi

Failure analysis of reinforced foundation using transparent soils

J.F. Chen* (China), X. P. Guo, J. F. Xue, P. H. Guo

Hydraulic Conductivity of Bentonite-Polymer Geosynthetic Clay Liners to Coal Combustion Product Leachates

Jiannan Chen* (China), Kuo Tian, Craig H. Benson

The Properties of Reinforced Retaining Wall under Cyclic Loading

Lihua Li, Junchao Yang, Zhi Hu* (China), Henglin Xiao, Yongli Liu

A solution to estimate stresses in backfilled stopes by considering self-weight consolidation and arching

Jian Zheng* (Canada), Li Li

Geoenvironmental Aspect in Energy Geotechnology Ⅰ

Chairs: Tomoyoshi Nishimura, Yuemiao Liu
Room: Boardroom

A preliminary simulation of CO2-EOR and storage in one heavy oil carbonate oilfield offshore Guangdong, China

Pengchun Li* (China), Jiemin Lu, Di Zhou, Xi Liang

Mixed Region Simulation on Subsurface Gas Storage of CO2 and CH4 in a Power-to-Gas System

Jianli Ma, Qi Li* (China), Michael Kühn, Xiaying Li

Carbon sequestration in Malaysian oil palm plantations – An overview

Nik Norsyahariati Nik Daud* (Malaysia), Anijiofor Sandra Chinenyenwa, Thomas Hywel Rhys, Lum Ken, Hosking Lee

Non-isothermal gas flow during carbon sequestration in coalbeds

Min Chen* (UK), Lee J. Hosking, Hywel R. Thomas

Numerical simulation of subsurface uranium (U) leaching and migration under geologic carbon storage conditions

Liwei Zhang* (China), Xiuxiu Miao, Yan Wang, Hongwu Lei, Xiaochun Li

Surface Monitoring Strategies at CO2 Storage Sites

Matthew Myers* (Autralia), Cameron White, Alf Larcher, Bobby Pejcic

Deformation and saturated permeability characteristics of bentonite-sand mixtures saturated on salt solution

Wenjing Sun* (China), Cheng Liu

Evaluating Influence of Cementation in Bentonite Buffer Material Based on the Swelling Properties of Bentonite Ore

D. Ito* (Japan), H. Komine, S. Morodome, T. Sekiguchi, G. Miura

Dissolved CO2 injection to eliminate the risk of CO2 leakage in geologic carbon storage

Victor Vilarrasa* (Spain), Maria Pool, Silvia De Simone, Jesus Carrera

A prediction method for swelling deformation of bentonite and its s and-mixtures in salt solution

G. S. Xiang* (China), Y. Wang

15:20-17:00 Wednesday Oct. 31 2018

Tailings and Mine Wastes

Chairs: Yaolin Yi, Lingling Zeng

Room: Xixi I

Pore Size Distribution and Hydraulic Conductivity Characteristics of Solidified Sewage Sludge

Xihui Fan* (China), Wei Zhu, Haoqing Xu, Shengwei Wang, Shi Shu

Effects of permeable reactive barriers for treating uranium mine pit water

Nana Li* (China)

Numerical model for electro-osmotic drainage in unsaturated soils

Liujiang Wang* (China), Sihong Liu, Yaoming Wang, Chenyang Xue

Study on Consolidation Behaviors of Waste Slurry by Using Vacuum Filtration Test

Bin Zhang* (China), Liangtong Zhan

One-dimensional Model for Sedimentation and Consolidation of Tailings Slurry

Yijie Wang, Dantong Lin, Liming Hu* (China)

A numerical study of the effect of wick drains applied in mine stopes with paste fill

Pengyu Yang* (China), Li Li, Gengshe Yang

Study on Dynamic Characteristics of Over-wet Loess Modified by Red Mud under Cyclic Loading

Xiaoqiang Dong* (China), Ruifeng Chen, Gaoyuan Tian

The Effects of Meta-kaolin on pH, Electric Conductivity (EC) and Ca2+ ions Consumption of Lime-Treated Laterite

Gideon M. Limunga, Yun-zhi Tan* (China)

Droplet interaction with hydrophobic granular materials: an insight with the Lattice Boltzmann method

Kang Hengyi, Sérgio D. N. Lourenço* (Hong Kong SAR), Ryan Yan

Effect of Additives on Consistency Limits of Red Mud Waste: A Comparative Study

N. Gangadhara Reddy* (India), B. Hanumantha Rao

Optimization of disposal areas by studying of the mining rock waste granulometry of an

iron mine

Christ Jesus Barriga Paria* (Brazil), Hernani Mota de Lima, Eleonardo Lucas Pereira

Technological characterization of tailings from iron and gold mining with a geoenvironmental focus for reuse in geotechnical application

Thaís Guimarães dos Santos* (Brazil), Luís Fernando Ribeiro Martins, Evelin Rodriguez Sosa

Biogeotechnical Engineering

Chairs: Peter Cleall, Fusheng Zha
Room: Xixi II

A modeling study of the bio-geochemical processes in microbially induced calcite precipitation

Xuerui Wang* (Germany), Udo Nackenhorst

Modelling the Effects of Thermal Gradient on Microbe Facilitated Mineral Precipitation Kinetics in Subsurface Flow Conditions

Shakil A. Masum* (UK), Hywel R. Thomas

The comparison of microbiologically-induced calcium carbonate precipitation and magnesium carbonate precipitation

Xiaohao Sun, Linchang Miao* (China)

Use of bionanocementation as a technique in increasing resistance to sandy soil

Bruna Bilhar Dall Agnol, Antonio Thome* (Brazil)

Complex Conductivity and Shear Wave Velocity Responses of Sand-Calcite Mixture

Junnan Cao, Chi Zhang, Bate Bate* (China)

Evaluation of the strength of compacted lateritic soil treated with Sporosarcina Pasteurii

Kolawole J. Osinubi, Emmanuel W. Gadzama, Adrian O. Eberemu* (Nigeria), Thomas S. Ijimdiya, Sabo E. Yakubu

A Model for Aerobic Biochemical Degradation of Municipal Solid Waste

Diankun Xiao, Wenjie Xu* (China), Liangtong Zhan, Yunmin Chen

Compacted Sewage Sludge as a Barrier for Tailing Impoundment: the Microbial Functional Diversity in the Compacted Sludge Specimen

Qing Zhang* (China), Huyuan Zhang, Jinfang Wang

Unconfined compressive strength of Bacillus pumilus treated lateritic soil

Kolawole J. Osinubi, John E. Sani, Adrian O. Eberemu* (Nigeria), Thomas S. Ijimdiya, Sabo E. Yakubu

Microbial induced solidification of municipal solid waste incineration fly ash

Guiwei Wang, Hui Xu* (China), Xiaoqing Ding, Yanxu Gao, Ping Chen, Xiufang Hu

Influence of physical and biochemical composition of three cellulose fibers on cracking of soil

Rishita Boddu, Hong Min, Yongkang Deng, Fengjiao Chen, Ankit Garg, Sanandam Bordoloi, Viroon Kamchoom* (Thailand)

Geoenvironmental Risk Assessment, Management and Sustainability

Chairs: Ankit Garg, Han Ke
Room: Xixi III

The effect of climate change on alpine mountain hazards chain: A case study in Tianmo Ravine, Tibet, China

Jiao Wang, Yifei Cui* (Hong Kong SAR), Clarence E. Choi, Charles W. W. Ng

Quantitative assessment of human risk from landfill failure in Shenzhen, China

S. Zhang* (China), C. Li, Y. Liu

Qualitative evaluation of methods applied to sustainable remediation

A. B. Braun* (Brazil), A. W. da S. Trentin, A. Thomé

Stability analysis of the refuse dam in Xiaping MSW landfill, China

Shi Yu Zhao* (China), Han Ke, Sheng Ze Lan, Shuai Zhang, Jie Hu

Response differentiation of rock characteristics under impact loading

Naigen Tan* (Australia)

The Slope Stability Analysis under the Coupling Effect of Earthquake and Rainfall

Yongfen Ruan* (China), Bingjun Shi, Jun Yang, Shuanshuan Peng

Use of forecast models for the interpretation of the stability of earthworks

Moustafa Hamze-Guilart*(Brazil), Maria Eugenia Gimenez Boscov, Lineu Azuaga Ayres da Silva, Guillermo Ruperto Martin-Cortés

Assessment of physical vulnerability to Landfill failure -taking Shenzhen as an example

S. Zhang* (China), Y. Liu, C. Li

Reliability Evaluation of Two Compacted Tropical Soils for Use in Municipal Solid Waste Containment Application

A. M. Kundiri* (Nigeria), K. J. Osinubi

Capacity Enhancement of a Landfill on a Sloping Ground Using Engineered Berm at the Toe

Abinash Mahanta* (India), Manoj Datta, Gunturi Venkata Ramana

Application of Geosynthetics in Geo-environmental Engineering Ⅱ

Chairs: Megan Hart, Xiaowu Tang

Room: Xiyuan III + IV

Containing Bauxite Liquor using Bentonite-Polymer Composite Geosynthetic Clay Liners

Kuo Tian* (USA) and Craig H. Benson

Mechanical damage of geosynthetics used in the base liner system of landfills caused by different aggregates

José Ricardo Carneiro* (Portugal), Ana Cláudia Brás, Maria de Lurdes Lopes

Resistance of geotextiles against the isolated and combined effect of mechanical damage under repeated loading and abrasion

José Ricardo Carneiro* (Portugal), Filipa Escórcio, Maria de Lurdes Lopes

The Effect of Pore Size Deformation on Multi-Pore Model of Woven Geotextiles in Tension Test

Wenfang Zhao, Xiaowu Tang* (China)

Field monitoring of a geogrid reinforced MSW slope

Pengcheng Ma, Jiwu Lan* (China), Han Ke

Analytical study of the variation of pore size characteristics with biaxial tensile strains on woven slit-film geotextiles

Lin Tang* (China), Xiaowu Tang, Shaoxing Qu

Role of plant health parameters in understanding spatial heterogeneity of hydraulic conductivity of vegetated soil: A case study of urban green infrastructure monitoring

Ankit Garg, Vinay Kumar Gadi* (India), Siraj Hossain, Abhinav, Ravi Karangat, Sreedeep Sekharan, Lingaraj Sahoo

Root morphology and mechanical characteristics of Himalayan (Indian) native plant

species
Tarun Semwal, Shyam K. Masakapalli, Venkata Uday Kala* (India)
Using Fluid Loss to Evaluate the Hydraulic Conductivity of Geosynthetic Clay Liners under Mining Leachates
Yang Liu* (China), Yu Hao, Lizhen Wang
Spatial heterogeneity of hydraulic conductivity in green infrastructure due to presence of wilted and live grass: A field study
Vinay Kumar Gadi, Siraj Hossain, Gitanjali Deka, Ankit Garg, Ravi Karangat, Sreedeep Sekharan* (India), Lingaraj Sahoo

Geoenvironmental Aspect in Energy Geotechnology Ⅱ
Chairs: Haibing Shao, Jian Ji **Room: Boardroom**
Heat Transfer in Gas Hydrate Bearing Sandstones
Zhiqiang Liu, Linlin Wang* (China), Guangqing Zhang
Hydraulic Characterisation of Clay Rock under Consideration of Coupled THM Properties
Hua Shao* (Germany), Jürgen Hesser, Olaf Kolditz, Wenqing Wang
Thermal volumetric behaviour of compacted GMZ bentonite saturated with salt solution
Yong-Gui Chen* (China), Xin-Xin Dong, Xu-Dong Zhang, Wei-Min Ye, Yu-Jun Cui
Studies on the spatial distribution of radiogenic elements in the crystalline basement used for the evaluation of deep geothermal resources in the southwestern Quebec
Hejuan Liu* (China)
Applicability of sedimentary rock in hydraulic barrier system construction
S. Iso* (Japan), T. Motoshima, H. Komine
Evaluation on Hydraulic Conductivity of Heavy Bentonite-Based Slurry for Using on Decommissioning of the Fukushima Daiichi Nuclear Power Station
E. Yoshikawa* (Japan), H. Komine, S. Goto
Strain Distribution in Geothermal Energy Piles: A parametric Study
Rajni Saggu* (India)
Study on Thermo-hydro-mechanical Coupling Behaviors of Buffer Material
Shengfei Cao* (China), Yuemiao Liu, Jingli Xie, Like Ma
Salinity and Clay Mineralogy Effects on Consolidation Behavior of Pure Clays
Tongwei Zhang* (China), Yongfeng Deng, Haocheng Xue, Zhang Xingjun, Wang Shijun

POSTER SESSION

17:40-19:00 Tuesday Oct. 30 2018

Location : 1st Floor of Conference Center

Risk Assessment for Planning the Nuclear Power Plants Construction in the Areas of Karst Development

E. Stanis* (Russia), K. Shunenkova, A. Anikeev

Sustainability in life cycle analysis of nanomaterials applied in soil remediation

Visentin Caroline* (Brazil), Thomé Antônio

Laboratory tests of the influence of clogging on the hydraulic properties of nonwoven geotextiles

Anna Miszkowska* (Poland), Eugeniusz Koda, Anna Sieczka, Piotr Osiński

Study on Influence of Geological Heterogeneity on Migration of LNAPL in Contaminated Site through Numerical Analysis

Jinpeng Zhang, Zhibin Liu* (China), Songyu Liu, Qibing Wei, Yi Wang, Liangliang Lu

Accelerated carbonation technology of reactive MgO-stabilized soil for possible CO2 sequestration

Guanghua Cai* (China), Songyu Liu, Guanghui Shao, Guangyin Du, Liang Wang

Relationship between Arsenic Phases and Leaching in Excavated Mudstone after Removal of Leachable Fraction

Shoji Suzuki* (Japan), Masahiko Katoh

Numerical parametric study of multiple pollutants transport through compacted clay liner

Shi Shu* (China), Wei Zhu, Haoqing Xu, Xihui. Fan, Shengwei Wang

Concentrations of the naturally-derived toxic elements and its geochemical characteristics of the alluvial marine clay layer of Osaka Plain, Japan

Hiroko Ito* (Japan), Harue Masuda, Akihiko Oshima

Geotechnical characterisation of submarine sediments from a polluted site

Sollecito Francesca* (Italy), Cotecchia Federica, Vitone Claudia

Experiment on monitoring leakage of landfill leachate through electrical resistivity tomography

Ping Yang, Yao-hui Liu* (China), Si-hao Zhang, Shou-bao Xue

Estimation of Strength Parameters of Solid Waste Materials by Corn Penetration and Spiral Pile Pull Out Tests

Shimon Ideguchi, Kiyoshi Omine* (Japan), Satoshi Sugimoto

Effect of powder particle size on the WRC of GMZ bentonite

Bao Chen, Yiyi Huang* (China), Kang Zhang, Chilong Li

A method for evaluating corrosion of contaminated soil—electrochemical impedance spectroscopy (EIS) method

Bin He, Yong Wang, Ruizhen Xie, Pengju Han, Xiaohong Bai* (China)

Arsenic Removal from Contaminated Soil by Phytoremediation Combined with Chemical Immobilization

Saki Arita, Masahiko Katoh* (Japan)

Effect of freeze-thaw cycling concurrent with MSW landfill leachate on the hydraulic conductivity of geosynthetic clay liner

Bao Wang* (China), Bin Chen, Tongtong Dou, Lou Wang

Experimental investigation of Volume Change and Hydraulic Conductivity on Geosynthetic Clay Liner

Guangwei Zhang (China), Huyuan Zhang, Jinwen Liu, Lang Zhou, Ming Yan, Jinfang Wang

Dynamic optical fiber monitoring of water-saturated sandstone during supercritical CO2 injection at different sequestration pressures

Chengkai Fan, Qi Li* (China), Xiaying Li, Zhiyong Niu, Liang Xu

The effects of probe diameter and penetration speed on the miniature penetrometer tests

Wei Bai* (China), Ling Wei Kong, Rong Bing Lin

Diversity of Bacterial Structure Community in the Compacted Sewage Sludge as a Barrier for Tailings

Qing Zhang (China), Huyuan Zhang, Jinfang Wang

Mapping of Risk Areas in Communities of João Pessoa, Paraíba, Brazil

Camila de Andrade Oliveira* (Brazil), Hanna Barreto de Araújo Falcão, Fabio Lopes Soares

Diffusion characteristics of lead, zinc, cadmium in a novel phosphate-based binder stabilized soil

Ya-Song Feng, Yan-Jun Du* (China), Wei-Yi Xia, Wei-Wei Ren

Stabilization of smelter industry contaminated soil using a sustainable steel-slag-based binder

Ya-Song Feng, Yan-Jun Du* (China), Shi-Ji Zhou, Wei-Yi Xia

TECHNICAL VISIT

Date: Nov. 1, Thu.	
8:45	Departure from Sheraton
9:30-10:30	Tianziling MSW Landfill
10:40-11:10	Construction Wastes Recycling Pilot Test Site
11:20-11:40	Tianziling Jingmai Town
11:50-12:50	Lunch in Jingmai Town
13:30-14:10	Xiecun Transfer dock for Construction Dregs and Slurry
15:00	Back to Sheraton

Tianziling MSW Landfill

Hangzhou Tianziling Landfill – Project I, which was designed in 1987, is the first municipal solid waste (MSW) sanitary landfill in China before the enactment of the Technical Code for Municipal Solid Waste Sanitary Landfill (CJJ17-88). The top elevation of the waste dam, which was a roller compacted rockfill dam, was 65m. The final height of the waste body and the storage capacity of landfill were designed to 165m and $6\times10^6 m^3$, respectively. In order to prevent the leachate generated from the buried MSW from polluting the downstream groundwater, vertical seepage control measures, mainly grouting curtains, were designed underneath the interception dam and at the lower side of the regulation pool. The leachate was treated by a low oxygen-aerobic activated sludge process. 10-year groundwater monitoring results showed that the seepage control was effective to an extent. This project has been awarded as a demonstration project and excellent project by the Ministry of Construction, the State Environmental Protection Bureau and the State Science and Technology Commission, and promoted throughout the country.

Hangzhou Tianziling Landfill - Project II was constructed on the basis of the success of Project I and the advanced technology at home and abroad. This project started in December 2003, and the first phase was completed in December 2006, which was located 440 meters west of the downstream of Project I and covered an area of about 1700 acres with a total storage capacity of $2.2\times10^7 m^3$. The first phase of Project II was designed to absorb 24.05 million tons of MSW at a daily disposal rate of 1940~4000 tons and service for 24.5 years. Advanced computer measurement and control system network was implemented in the management area to monitor and manage the whole operation process to achieve domain management, authority management and resource sharing; the reservoir seepage prevention system adopted international leading vertical anti-seepage technology combined with the vertical grouting curtain system and the horizontal composite barrier system made of a double-layer high-density polyethylene (HDPE) geomembrane and a geosynthetic clay liner (GCL). The sewage treatment plant undertook the disposal of sewage from both projects, and the designed daily treatment rate was 1500 tons by combinations of two-stage pressurized biochemistry and air flotation. The effluent quality was monitored online before the effluent was introduced to the municipal pipe network.

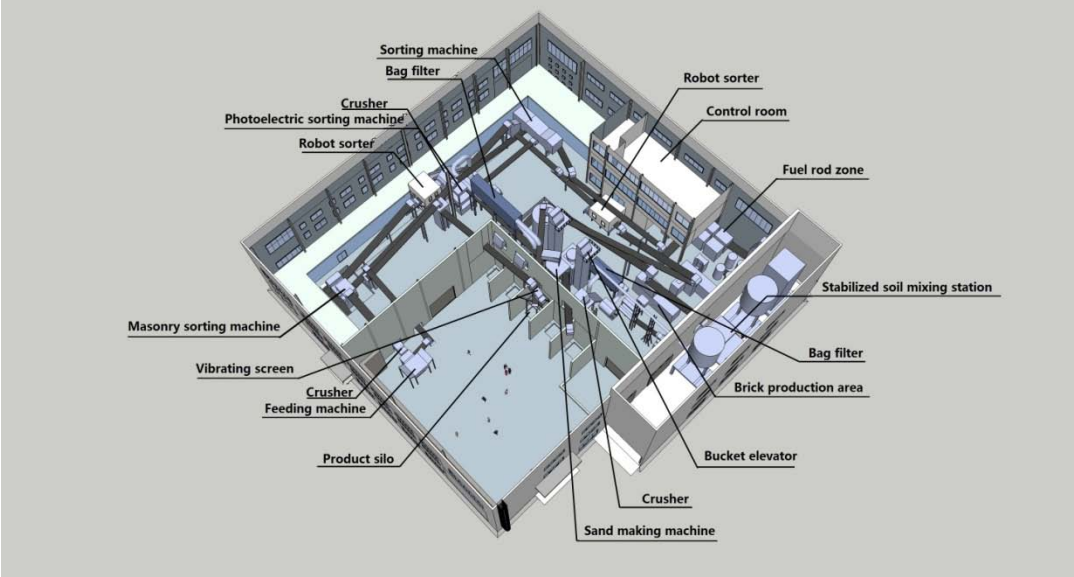
Construction Wastes Recycling Pilot Test Site

The Hangzhou Tianziling Construction (Renovation) Wastes Recycling Pilot Project is the first domestic project for the renovation of waste recycling. The project covers an area of about 4,300 square meters, with a plant construction area of 3,800 square meters and a total investment of 38 million yuan. It treats 100,000 tons of construction (renovation) waste annually and processes 3 hundred tons per day. Fully-loaded capability can reach 300,000 tons per year and 800 tons per day.

The project adopts non-incineration pure-physical processing technology, and introduces advanced equipments such as masonry sorter, photoelectric sorter, robot sorter, Dutch imported light material sorter, dust collector, etc, which meets requirements in dust removal and noise reduction.

The project has four production lines, namely the construction (renovation) waste sorting and crushing production line, the block forming production line, the cement stability mixture production line and the fuel-rod production line.

After the processes including mechanically sorting, photoelectric sorting, crushing and screening, light material sorting, iron removal and robot intelligent sorting, the construction (renovation) waste is renewed into clean sand aggregate, brick sand, sieving soil, scrap iron, light materials (including broken wood, plastic, cloth, etc.) and other substances. Then they are made into various types of products by the production lines to fulfill “reduction, reuse, and harmlessness” of the construction (renovation) waste.



Xiecun Transfer dock

Xiecun Transfer dock, located at No. 111 Gongxie Road, Gongshu District, Hangzhou, is a key project of the Hangzhou Municipal Government and the Municipal Solid Waste Management Working Group. According to the instructions and requirements of the municipal government, the company made overall technical upgrades to the dock and transformed it into Hangzhou's first large scale, modernized construction waste transfer point.

In February 2017, Xiecun dock officially started construction and reconstruction, and the pier was officially completed at the end of June. Seven 500-ton berths will be reconstructed, including 6 waste soil transfer berths and 1 mud transfer berth. The dock covers an area of about 72 acres. After completion, it will consume 24.3 million tons of waste soil and 3 million tons of mud for construction in Hangzhou. 70% of the construction dregs in the main urban area of Hangzhou will be transported to Xiecun dock for disposal since the dock was completed.

SOCIAL EVENTS

Welcome Reception

Location: 3rd floor balcony of the conference center in Sheraton Hangzhou Wetland Park Resort
Date & Time: Oct. 28 (Sun.), 18:00-20:00
Address: 1 Westbrook Resort, Zijingang Road, Hangzhou

Get to know the conference venue and meet the 8ICEG participants, collect your registration package and enjoy the casual drink and light snacks.

Banquet

Location: Xixi Hall of the conference center in Sheraton Hangzhou Wetland Park Resort
Date & Time: Oct. 30 (Tues.), 19:00-21:00
Address: 1 Westbrook Resort, Zijingang Road, Hangzhou

Delicious Chinese food will be served in the banquet, accompanying with performance of Chinese traditional music and Sichuan opera face.

**Additional ticket is required (100 USD/ 600 CNY paid in the registration)*

Impression West Lake

Location: Yue Lake Scenic Area, opposite Yuewang Monastery (岳湖景区内，岳王庙对面)
Date & Time: Oct. 31 (Wed.), 18:30-21:00
Address: No.29 Yanggong Causeway, Hangzhou

Impression West Lake vividly presents the history and culture of West Lake by exploring the folklore and myths of Hangzhou and highlighting the best of them. It also highlights the beautiful landscape of West Lake. Using hills as the stage background, the whole performance of Impression West Lake takes place on the water.

**Additional ticket is required (100 USD/ 600 CNY paid in the registration).*
** It is better to take a coat or jacket since the venue is open-air.*

SPONSORS

GOLD

LVNONG ENVIRONMENT
绿 农 环 境

Zhong Lian Ge Lin
中联格林

SILVER

MACCAFERRI

欧美大地
EARTH PRODUCTS CHINA LIMITED

杭州环境
Hangzhou Environmental Group

EXHIBITORS

南/智/传/感
NanZee Sensing

BOSTD
GEOSYNTHETICS

Shandong Zhongyi Rubber-Plastic

SENEVEN
甚致环保

SOILVISION

ZPF™
智 平 基 础

杭州绿农环境工程有限公司

Hangzhou Lvnong Environmental Engineering Co., Ltd.

Hangzhou Lvnong Environmental Engineering Co., Ltd. founded in January 2013, is located in Hangzhou, Zhejiang. It is an ecological and environmental protection service enterprise, which focuses on the comprehensive restoration and renovation of the mine, the recycling and disposal of construction waste and the comprehensive exploitation and utilization of land.

At present, Lvnong Environmental Engineering Co., Ltd. is the largest enterprise engages in construction waste, muck disposal and mining rehabilitation in Zhejiang province. The company adheres to the business philosophy of “Environmental governance integrated service provider”, based on the integration of environmental protection industry chain. Nowadays, the main business of the company is divided into three major sectors: Utilization of construction waste. The transfer dock of construction waste and Landfill disposal of construction wastes.

Contact:

Address: Room 1405, Building 2, Qianjiang International Times Square, Jianggan District, Hangzhou, Zhejiang Province, China
Tel.: +86 18890364241
Email: lvnonghj@163.com

Company Profile: Tianjin Zhonglian Gelin Science & Technology Development Co., Ltd. was established in February 2009, which is a professional producer for geosynthetic clay liners (ZLGL®) and a solution provider of vertical cut-off barrier.

With so many years' unremitting efforts, we have achieved the leading position and great achievements.

1. First production line of GCL in China
2. Solution Provider of GCL Composite Vertical Cut-off Barrier.
3. Maker of Chinese GCL industry standards
4. Supplier of some noticeable companies at home and abroad & OEM of foreign corporation
5. GCL A.P.I. service solution
6. Rich patent technology reserve
7. Quality certification by professional institutions

We insisting on enterprise creed which states "quality for existence, technology for excellence, innovation for progresses", are willing to work together with all friends of various circles to seek long-term development.

GCL Composite Vertical Anti-seepage Barrier

GCL Composite Vertical Anti-seepage Barrier is an innovative composite vertical anti-seepage system which combines GCL with conventional vertical cut-off wall.

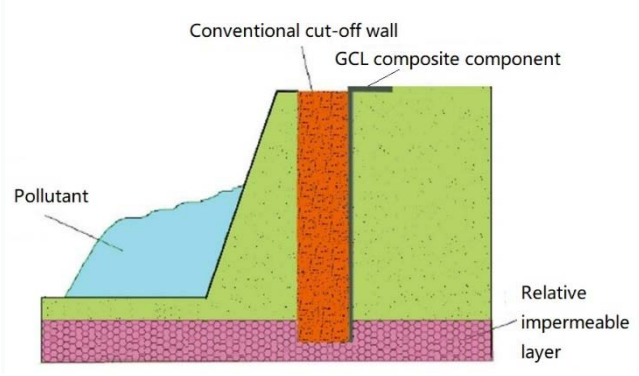
1. Characteristics:

- Introduce GCL into vertical anti-seepage, permeability ≤ $1*10^{-7}$cm/s, in line with environmental protection requirements.
- Settle some defects of conventional cut-off wall, such as low permeability level, poor chemical compatibility and great difficulty in construction.
- Composite structures can cope with more complex projects.
- Mechanized construction, high construction quality and high construction efficiency.

2. Scope of Application:

Can be applied to slotted vertical cut-off walls.

It is especially suitable for the vertical anti-seepage field with high anti-seepage requirements such as pollution site repair, landfill, old simple landfill reconstruction and tailings dam.



Schematic of GCL Composite Vertical Anti-seepage Barrier

Address: Shuangyao Industrial Site, Jinghai District, Tianjin

Website: www.gcl-tj.com **Email:** tjzlgl@163.com

Company Profile: 130 years ago we invented Gabions and dramatically changed civil engineering's landscape. We are still changing it today. We work everyday, with 130 years of our history, to find better solutions for our clients at every degree of latitude and longitude. We make innovation happen around the world, we share our knowledge capital to multiply the return on investment of clients and partners, and we offer ongoing support to establish relations built on solid trust. This is us: Maccaferri.

We are a global company, with more than 70 subsidiaries operating in 5 continents, with an on-site presence in more than 100 countries, and nearly 3000 employees: we are highly-specialized professionals trained in designing and developing complex solutions in the civil engineering, geotechnical and environmental construction markets. Our worldwide network grows through innovation and diversification of its sectors of activity and through an increasing range of high quality and environmentally-friendly products and applications.

About Geosynthetics

With 140 years of history, 3000 employees, over 30 manufacturing facilities and local operations in 100 countries around the world, Maccaferri can truly claim to have a global presence with local focus. The knowledge and capability to easily combine products and solutions enables Maccaferri to offer clients tailored solutions, optimizing value and reducing project cost. Maccaferri works with its clients to develop, manufacture, design and construct solutions for the construction industry. Our geosynthetics products can be used to fulfill the following main functions:

Reinforcement
Stabilization and Asphalt Reinforcement
Drainage
Separation, Filtration and Protection
Barrier Systems
Erosion Protection

Add: No. 205, Xieyuan North Road, Ningxiang Economic Development Distict, Changsha, Hunan Province

Tel: (86) 0731 87744577

Fax: (86) 731 87051477

南/智/传/感
NanZee Sensing

Contact:

Add: Room A301, No.150, Ren Ai Road, Suzhou Industrial Zone, Jiangsu Province, China
Tel.: +86 18362615435
Email: pengqq@nzsensing.com
Website: www.nzsensing.com

Company Profile:

NanZee Sensing Technology located at Suzhou Industrial Park, is a company founded by R&D team focused on applications of distributed fiber sensing technology from Nanjing University, China. We develop and manufacture sensors and equipments based on opto-electronics for monitoring in civil engineering and geosciences. It is a fast growing technology company and owns patents, proprietary technologies and know-how. NanZee has emerged as a leader in the opto-electronic sensing industry in the global market.

The company develops and manufactures optical fiber sensors and data loggers which are used for measuring strain, stress, displacement, pressure, temperature and etc. Besides the development and integration of distributed monitoring systems which are applied in civil engineering and geosciences, NanZee also provides consultation, solution, test, OEM and other services centered on fiber optic sensing technology. These technology and products are widely used for the intelligent monitoring, health diagnosis, disaster warning and safety evaluation of foundations, anchors, tunnels, bridges, subways, railways, highways, landslides, steel and concrete structures, embankments, gas pipelines, large tanks and facilities and structures.

Contact:

Add: Qingda Industrial Zone, Chengyang District, Qingdao, Shandong Province, China
Tel.: +86 13969741531
Email: techservice@bostd.com
Website: www.bostd.com

Company Profile:

The BOSTD Group is an integrated international manufacturer and supplier of high quality geosynthetic solutions.

1: BOSTD Geosynthetics

Established in 2000 BOSTD Geosynthetics has manufacturing facilities for a wide range of products together with specialized test equipment for product development. We also have a team of specialist engineers who offer supporting technical and design services to provide economic engineering solutions for our Clients. Our product ranges cover integral punched and stretched plastic geogrids, drainage nets and composites, geocomposites, asphalt reinforcement material and geocells that are widely and effectively applied in soil stabilization, foundation reinforcement and drainage, landfill and waste water treatment, retaining walls and steep slopes, riverbank repair and development, erosion control and green field applications.

2: BOSTD America

Established in 2015 and located in Oklahoma, BOSTD America is ideally positioned to supply geogrids from its state-of-the-art production and QC facility and other BOSTD Group products to the US market.

3: BOSTD International

Established in 2000 and based in Europe, BOSTD International is responsible for developing and supporting the distribution network in all markets other than the USA and China. Between them, our principals share more than 60 years' experience of the international development, manufacture, application and marketing of geosynthetics to bring to the assistance of our distributors.

SHANDONG ZHONGYI RUBBER-PLASTIC CO., LTD

Contact:

Add: Shanbo Road, High-Tech District, Jining City, Shandong Province, China P.C. 272071
Tel.: +86 537 5663373
Fax: +86 537 2486688

Company Profile:

Shandong Zhongyi Rubber-Plastic Co., Ltd was founded in 2003 has been National High-Tech Enterprises, member of China Plastics Processing Industry Association (CPPIA), member of China Technical Association on Geosynthetics. The Headquarters is located in Jining City in Shandong province.

Our factory focused on the color masterbatch, additive masterbatch, filler masterbatch, modified plastic and pre-dispersed rubber masterbatch five areas. Our annual output is more than 30000 tons and sales throughout the country while some products are exported to the United States, South Korea, Thailand, South Africa as well as other countries. More than 400 big customers has been set up long-term stable relations of cooperation with us. Our product servicing agricultural films, food packaging, pipes and construction materials, converyor belt, tires and other industries.

SOILVISION

Contact:

Add: 120-502 Wellman Crescent, Saskatoon, SK S7T 0J1 Canada
Tel.: (306) 477-3324
Fax: (306) 955-4575

Company Profile:

A pioneer in the field of 3D slope stability analysis – SoilVision is considered a leader and innovator in 2D and 3D numerical analysis software for geotechnical, geoenvironmental, hydrogeological and soil science applications. Our robust, feature-rich software platform provides an easy means of analyzing complex strata more accurately and efficiently than ever before – resulting in project cost reduction and improved safety. In 2017, we celebrated our 20th anniversary. In 2018, SoilVision Systems Ltd. was acquired and became a wholly owned subsidiary of Bentley Systems, Incorporated. Bentley has more than 3,500 colleagues in over 50 countries.

SENEVEN 甚致环保 上海甚致环保科技有限公司
SHANGHAI SENVEN ENVIRONMENTAL PROTECTION TEC CO., LTD.

Contact:

Add: Shanbo Road, High-Tech District, Jining City, Shandong Province, China P.C. 272071
Tel.: +86 13817429575
Email: xiaoyong81@163.com
Website: http://www.landect.net/

Company Profile:

■ Leak location survey service for the newly constructed landfill

➢ With over 10 years and 4 million m^2 geomembrane leak location surveys experiences, is the market leader of the leak location survey industry in china.
➢ Two types of survey methods are offered for the newly constructed landfill, geo-electric leak location survey method for soil-covered geomembrane, the other one arc test method for exposed geomembrane or geomembrane covered with conductive medium materials such as geotextiles, geocomposites etc.

■ Full lifetime electrical leak monitoring service

➢ Using electrical Leak Monitoring system permanently installed in the landfill liner，leak could be monitored and located in the full lifetime of the landfill.
➢ We specialize in full lifetime leak monitoring system and hold full proprietary technology on that, including conductive geocomposites and conductive geotextiles.