

GEOCHINA 2021

INTERNATIONAL CONFERENCE

**Civil & Transportation Infrastructures:
From Engineering to Smart & Green
Life Cycle Solutions**

CONFERENCE PROGRAM
NANCHANG, CHINA
SEPTEMBER 18th ~ 19th, 2021

Hosted by



in cooperation with the American Society of Civil Engineers (ASCE),
Transportation Research Board (TRB), and University of Oklahoma

Co-sponsors



GeoChina International Conference

Civil Infrastructures Confronting Severe Weathers and Climate Changes:
From Failure to Sustainability

Nanchang, China • September 18th ~ 19th, 2021

Invitation

On behalf of the Organizing Committee, we are pleased to invite you to attend the Sixth GeoChina International Conference 2021 to be held in Nanchang, China from September 18th ~ 19th, 2021. This conference with theme of Civil & Transportation Infrastructures: From Engineering to Smart & Green Life Cycle Solutions is endorsed by a number of leading international professional organizations. This conference will provide a showcase for recent developments and advancements in design, construction, and safety Inspections of transportation Infrastructures and offer a forum to discuss and debate future directions for the 21st century. Conference topics cover a broad array of contemporary issues for professionals involved in bridge, pavement, geotechnical, tunnel, railway, and emerging techniques for safety Inspections. You will have the opportunity to meet colleagues from all over the world for technical, scientific, and commercial discussions.

Nanchang is a famous historical and cultural city with a history of over 2,200 years. Long and splendid history endows the city with many cultural relics. The poetical Tengwang Pavilion has long been ranked first among the famous pavilions in the south of Yangtze River. Recent rapid construction in China has provided great opportunities for bridge, pavement, geotechnical, and tunnel engineers to use their knowledge and talents to solve many challenging problems involving highway bridge structures, pavements, materials, ground improvement, slopes, excavations, and tunnels with innovative solutions and cutting-edge technologies.

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GEOCHINA 2021 - CONFERENCE PROGRAM AT A GLANCE**(September 17th, Friday, Beijing Time)**

10:00 AM 11:30 AM	Preconference -Waste Plastic in Roads (3 Invited) Moderator – Glynn Holleran, Ph.D., University of Auckland, New Zealand
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Day 1 (September 18th, Saturday, Beijing Time)

14:00 PM 14:05 PM	Opening Ceremony, Welcome Prof. Changjie Xu, Vice President, East China Jiaotong University
14:10 PM 18:00 PM	Keynote Speech (5 Invited) Moderator – Hadi Khabbaz, Ph.D., University of Technology Sydney (UTS), Australia

Day 2 (September 19th, Sunday)

13:00 PM 14:50 PM	Session 1: Material II (5 papers)
14:00 PM 15:50 PM	Session 2: Material I (5 papers)
13:00 PM 14:50 AM	Session 3: Geotech I (5 papers)
14:00 PM 15:50 PM	Session 4: Geotech II (5 papers)
9:30 PM 12:00 AM	Session 5: Pavements (8 papers)

(September 20th, Monday, Beijing Time)

10:30 AM 11:15 AM	Closing Ceremony & Best Presenter Award Moderator – Shenen Chen, Ph.D., University of North Carolina at Charlotte, USA
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September 18th, Saturday, 14:00 PM ~ 18:00 PM (Beijing Time)**Speech 1: Geotechnical Research Contributions to Optimizing Offshore Wind Turbine Design****Presentation Summary**

The talk will set out the direction followed in long term research programs that have addressed the axial and lateral, monotonic and cyclic, behavior of large offshore driven pile foundations. Research that was undertaken originally to aid offshore oil and gas developments has now extended to consider a wide range of new geomaterials, several new phenomena and novel applications involving both monopile and jacket supported wind-turbines. The research has made a considerable impact on practice in northern Europe, where most of the world's offshore wind-turbines are currently installed. This impact is now extending to Asian and North American waters. While most of the research effort to date has addressed marine sands and clays, the most recent research has focused on applications in chalk, a very soft limestone found in the North, Baltic and Mediterranean Seas also the hard metamorphic rocks found offshore France and Scotland.



Dr. Richard Jardine is the Professor of Geomechanics at Imperial College where he is also Consul for Engineering and the Business School. He was elected Fellow of the Royal Academy of Engineering in 2002 and is also a Fellow of the UK Institution of Civil Engineers. In addition to teaching and administration Richard is engaged in international research JIPs and collaborates with groups worldwide. He is currently: Principal Investigator on the ALPACA JIP, studying offshore renewable energy foundations for chalk sites with Oxford, EPSRC and Industry; Co-Investigator on the PAGE foundation ageing JIP with Cathie Associates and GCG and an expert member of the Unified Pile Design Method JIP panel with Norwegian Geotechnical Institute (NGI), Fugro and UWA (Australia).

He holds a Royal Society Newton Advanced Fellowship with Zhejiang University (ZJU, China) which covers renewable energy and transport systems and is working on offshore wind turbine research with East China Jiaotong University. Richard has led multiple laboratory research studies into the static and cyclic constitutive behavior of sands, clays and chalks and other geomaterials. He is working with NGI on sampling in natural sands and is a Visiting Professor at ZJU, where he was appointed Distinguished International Scholar by the Chinese Ministry of Education. His recently completed research includes improving design for flood embankments on peats and organic soils with the authorities in Holland, advising the French national SOLCYP cyclic loading program, and studies with BP into climate change impact on Siberian permafrost and the stability of large underwater landslides in the Gulf of Mexico.

Speech 2: Inception of Debris Avalanches: a Material Point Method Modelling**Presentation Summary**

The advanced numerical modelling of the inception of debris avalanches is presented, with special emphasis to the case of the impact of a failed soil mass on stable deposits. Impact loading cause soil liquefaction; the landslide volume increases inside triangular-shaped areas during the so-called "avalanche formation", and also soil erosion along the landslide propagation path plays an important role. The Material Point Method (MPM) is used, which can be considered as a modification of the well-known Finite Element Method (FEM) in the general framework of large deformations. The numerical analyses are performed adopting either 2D or 3D geometrical configurations taken from field evidences and previous researches. Triangular 6-noded computational meshes are used, characterized by elements of about 0.5 m nearby the landslide source area, while gradually smaller in the proximity of the impact area. The interaction between the impacting mass, and then of the propagating flow with the in-situ stable soil is examined, providing important insights about the behavior of such type of landslide. It has shown that MPM can properly simulate the inception of debris avalanches and even their complex mechanisms during the impact and the interaction with in-situ stable zones.



Dr. Sabatino Cuomo is a Professor of Civil Engineering at the University of Salerno, Italy. He has been serving as the Management Director of ICGDR (International Consortium on Geo-disaster Reduction, <https://icgdr.com/>). He serves as the Associate Editor of the Geoenvironmental Disaster Journal (Springer Nature, <https://geoenvironmental-disasters.springeropen.com/>). He has served as the Coordinator of LARAM School (International School on "LAndslide Risk Assessment and Mitigation) for PhD students, <http://www.laram.unisa.it/>. He has authored and published more than 100 international publications (most in peer-reviewed international ISI Journals).

Dr. Cuomo has been serving as the Editorial Board Member of International Journals: Canadian Geotechnical Journal, Soils and Foundations, ICE Journal of Geotechnical Engineering, Bulletin of Engineering Geology and the Environment, Geoenvironmental Disasters, International Journal of Geosynthetics and Ground Engineering, Journal of Mountain Science. He has been participating many International Cooperations: UPM Madrid, Université Grenoble, NTNU Trondheim, Université Geneve, Northwestern University Chicago USA, University Rijeka Croatia, Beijing University China.

KEYNOTE SPEECHES

Speech 3: Advances in Uncertainty Quantification of Geotechnical Problems

Presentation Summary

The presence of uncertainties in geotechnical problems has been acknowledged by the engineering community and accounted for in codes of practice. These uncertainties include the spatial variability in material properties, uncertainties in construction, uncertainties in boundary and loading conditions, and so forth. There is growing need within geotechnical problems for rational ways of quantifying uncertainty and taking it into account in decision-making. By treating the uncertainties as random variables or in some cases as random fields, statistics-based reliability analysis and the specification of characteristic values are techniques adopted to handle uncertainties in a consistent manner. This presentation will provide an overview on the advances of various approaches for uncertainty quantification of geotechnical problems. As a powerful tool in dealing with uncertainties, the random finite element method will be emphasized with engineering application examples.



Dr. Yong Liu is a Professor in the School of Water Resources and Hydropower Engineering, and vice-director of the Institute of Engineering Risk and Disaster Prevention, Wuhan University. Dr. Yong Liu has been working on uncertainty quantification of geotechnical problems over 15 years. These problems include deep cement mixing in excavations, random seepage through dam embankments, artificial ground freezing in tunnelling, etc. He has received various funding grants relevant to this topic, including two from the National Natural Science Foundation of China. He published more than 90 academic papers in ASCE-JGGE, Géotechnique, Canadian Geotechnical Journal and other peer-viewed journals, among which three were selected as ESI highly cited papers. He has been serving as associate editor and editorial board member of several international journals.

Speech 4: From Engineering to Smart & Green Life Cycle Solutions

Presentation Summary

It has always been an important aspect of an engineering conference to not only focus on the technical content of the conference (which is the reason the conference is being held) but also on the cultural and engineering feats of the host location. During the COVID19 pandemic, international travel is severely curtailed, causing major disruption in the way we traditionally communicated technical information in conferences. For GeoChina 2021, ample use is made of the available technical systems to ensure that the technical content of the conference is still well-covered (and congratulations to the Organizers for that). Therefore, this Keynote presentation focuses on the linkages between the conference theme (Civil & Transportation Infrastructures: From Engineering to Smart & Green Life Cycle Solutions) and the host city (Nanchang). As capital and largest city of Jiangxi Province, Nanchang has a population of around 5.3 million, and is located in the north-central part of the province. It is bound on the west by the Jiuling Mountains, and on the east by Poyang Lake. Its strategic location connects the East and South China, and it is a major railway hub in Southern China. It is the 41st tallest city in the world, and hosts education facilities that support the development of engineering in China and the world. Its economy is well-linked to transportation, as it is a regional hub for agricultural production that needs to be transported through extensive networks to the market.



Dr Wynand Steyn is Head of Department and professor of the Department of Civil Engineering, and Chair of the School of Engineering at the University of Pretoria. He is a professionally registered pavement engineer with a research interest in vehicle-pavement interaction, accelerated pavement testing, pavement engineering, pavement materials, Civiltronics and instrumentation. He completed both his undergraduate and graduate studies at the University of Pretoria, South Africa. He has authored, co-authored and edited 44 journal papers, 22 book chapters (author / co-author / editor) and 109 conference papers. A summary of his publications can be found on his Researchgate page: https://www.researchgate.net/profile/Wynand_Steyn/publications. He is Associate Editor of the International Journal for Pavement Engineering and the International Journal of Pavement Research and Technology, and has a B3 National Research Foundation (NRF) rating. He is a Fellow of the South African Institution of Civil Engineers, Fellow of the South African Academy of Engineering (SAAE) and an adjunct professor at the Chang'an University in Xian, and the Shandong Jianzhu University in Jinan, China.

Speech 5: Enhancing Sustainability of Transportation Infrastructure Using Forensic Investigations

Presentation Summary

Transportation infrastructure plays an important role in the mobility of people and freight and in the economic vitality of a country. In many countries, aging transportation infrastructure coupled with extreme events such as flooding, drought, hurricanes, and extreme variations in temperatures is becoming a major challenge for the transportation agencies and the policy makers. Lack of resources compared to their needs making sustainability of infrastructure an important and timely topic. Learning from premature distresses or failures is helpful to improved design, construction and maintenance of infrastructure and its sustainability. Forensic investigations provide a tool for achieving this goal. In this presentation benefits and challenges of forensic investigations of roadway pavements, with a focus on the identification of causes of premature distresses in asphalt pavements such as transverse cracking, fatigue cracking, rutting, depression, and delamination. Specifically, this presentation will discuss case studies highlighting the selection of steps, tools, test methods (field and laboratory) and systematic analysis of results necessary for the success in forensic investigations. Also, recommendations for cost effective repair, rehabilitation, reconstruction, and maintenance for enhancing sustainability will be discussed..



Dr. Musharraf Zaman is the Aaren Alexander Professor of Civil Engineering and Environmental Science and Alumni Chair Professor of Petroleum and Geological Engineering at the University of Oklahoma. (OU). He has been serving as the Director of the Southern Plains Transportation Center (SPTC) – a consortium of eight universities in U.S. DOT Region 6 – for more than three years. He serves as the Editor-in-Chief of the International Journal of Geomechanics, ASCE and as the Executive Vice President of the International Association for Computer Methods and Advances in Geomechanics (IACMAG). He served as the Associate Dean for Research and Graduate Programs in OU College of Engineering for more than eight years.

Dr. Zaman has more than 35 years of experience in the areas of pavement materials and systems, geotechnical engineering, and geomechanics. During his tenure at OU, he has received more than \$30 Million in external funding, developed two new laboratories (Broce Asphalt Laboratory and Asphalt Binders Laboratory), and published 172 journal and 224 peer reviewed conference proceedings papers and 12 book chapters. His projects have been funded by NSF, Federal Highway Administration, U.S. Department of Transportation, Oklahoma Department of Transportation, and the private sector. His work on intelligent compaction, along with co-workers, has been funded heavily by the private sector and received patents. He has supervised more than 80 master theses and doctoral dissertations to completion. His research papers have own international-level awards from IACMAG and Indian Geotechnical Society.



WORKSHOP SPEAKERS

September 17th, Friday, 10 AM ~ 11:30 AM (Beijing Time)

Speech 1 (W1-1): Waste Plastic in Roads Workshop- Roads Are Not Linear Landfills

Presentation Summary

Much has been written and discussed on waste polymers in the environment, from microplastics entering the food chain to rafts in the ocean or clogging waterways. The problem is complex and has many contributions. For example, in some places, the lack of potable water has resulted in more bottled water and more PET waste. However, the primary issue on the use of waste plastics is the broad range of polymers used in packaging- that is the primary issue of waste polymer. Recycling is not new for plastics and appears to be growing. However, road applications are relatively new. The type of plastics that can be easily recycled is restricted in bitumen binders. There will be more discussion in this workshop. Soft plastics are the easiest to recycle. These include low and medium-density PE and EVA. HDPE is a little more complicated, and PP is far more complex. PET is not easily compatible with bitumen. Roads are not linear landfills, and the use of waste plastics should always promote the performance of the final asphaltic mix or seal.

The main issue is the morphology and stability of the final binder and its consequent rheology, stability, and aging characteristics. Solutions have included steric stabilization with co-polymers other materials, or tire rubber, logistical control by pre-blending immediately before binder injection or stirring, Masterbatching is also a methodology. Dry addition, too, has been used. The critical issue is the performance of the mix and binder; fortunately, there are methods to assess this. For example, PG grading, balanced mix design, and internal compatibility tests such as AFT are advantageous. Some examples are given here, and the following presentations illustrate them.

Glynn Holleran is a Research Fellow at the University of Auckland and a Managing Director Advanced Asphalt Technologies NZ Ltd. He has more than 40 years of experience in road engineering, polymer science, petroleum and bitumen chemistry, asphaltic materials, and construction across the globe. He is currently consulting work in NZ, India, Russia, and Qatar. He is a Research fellow at the University of Auckland specializing in asphaltic material and is the pavement advisor for a government project on dynamic charging of EVs. Glynn has many publications and has lectured around the world.



Speech 2 (W1-2): Waste Plastic Road Technology – Indian Perspective

Presentation Summary

India generates nearly 26,000 tonnes of plastic waste every day, making it the 15th biggest plastic polluter globally. Discarded plastic waste litter the country's roads, rivers and also form huge mounds in garbage dumps across the country. At the same time the steady increase in high traffic intensity in terms of commercial vehicles and the significant variation in daily and seasonal temperature has led to increased demand for improved road characteristics. Any improvement in the property of the binder(bitumen) is the need of the hour. In order to reduce this plastic waste disposal crisis research has been carried out by CSIR-Central Road Research Institute in recent years to use this waste plastic in road construction. The related experimentation has indicated that the waste plastic, when added to the asphalt mix, gives higher strength, higher resistance to water and better performance over a period of time. Waste plastic being polymeric in nature improves the adhesion between the aggregate and bitumen and hence improves the strength and rut resistance of bituminous mixes. CRRI made significant contributions to form the specifications for the use of waste plastic in road construction. This presentation will provide an insight to the process being adopted in India for using waste plastic in road construction.

Ambika Behl, Ph.D., is the Principal Scientist & Head of the Department- Flexible Pavement CSIR-Central Road Research Institute. Dr. Ambika Behl has done her PhD from IIT Roorkee in the area of Warm Mix Asphalt. She has a work experience of more than 15 years. She is a member of Bureau of Indian Standards (BIS) committee, Indian Road Congress (IRC) Committee, Assocham, Bitumen India Forum and Transportation Research group of India. She is actively involved in drafting BIS and IRC codes for highway material testing and specifications for flexible pavement construction in India. She has authored many research papers and articles on various subjects of asphalt pavements. She has delivered invited lectures at many national and international platforms. She is also a faculty for Academy of Scientific and Industrial Research (AcSIR) at CSIR – CRRI. She has been granted patent on the process developed for "use of PVC waste in paving applications". She received CIDC (construction industry development council) Vishwakarma Achievement Award 2021. She has a rich experience in Research and Development activities of Highway Sector in the area of Flexible Pavement Materials: Polymer modified asphalt, Warm Mix Asphalt Technology, Recycling of Pavements, Use of waste materials in road construction, Waste plastic Roads, Stabilized Pavements. She has guided many master's dissertations and she is serving as reviewer for many national & international journals like ASCE, ASTM, IJPRT, CBM, JPET. Her projects are funded by Department of Science & Technology (DST), Ministry of Road Transport & Highways (MoRTH), Department of



Speech 3 (W1-3): Waste Plastic Road Technology – US Perspective

Presentation Summary

Incorporating existing streams of recycled plastics into asphalt could offer benefits from sustainability, performance, and economic standpoint. Historical efforts to meet performance-graded (PG) asphalt specifications have been challenging for these materials. This presentation will share a perspective on which types of recycled plastics can be incorporated into asphalt binders to meet performance standards, such as AASHTO M320 and M332, using a Reactive Elastomeric Terpolymer (RET) compatibilizer. Furthermore, these systems meet ASTM 5976 (separation of polymer), AASHTO T301 (elastic recovery), and critical temperature (ΔT_c) specifications. Binder test results using various polyethylene densities (high, low, and linear low) will be reported. Additional work, including Balanced Mix Design (BMD) testing, theoretical pavement structural analysis, and monitoring results of field projects, will be discussed.

C.J. DuBois, Ph.D., is the Application Development Leader, Packaging & Specialty Plastics, Dow Inc. Dr. C.J. DuBois received a Bachelor of Science degree in Chemistry from Louisiana State University and a Doctor of Philosophy Degree in Organic Chemistry (Polymer Chemistry focus) from the University of Florida. His current role at Dow is as the North American Application Development leader for paving in Dow's Packaging & Specialty Plastics business. He participates in a number of trade groups related to paving, including the Alliance to End Plastic Waste, the Asphalt Institute, the Association of Asphalt Paving Technologists, the Association of Modified Asphalt Producers, the International Society for Asphalt Pavements, and the National Asphalt Paving Association. He has 23 patents or patent applications and has presented at a number of venues on polymers as asphalt modifiers.



TECHNICAL PROGRAMME

TECHNICAL SESSIONS (DAY 2: September 19th, Sunday, Beijing Time)

Session 1: Material II (September 19th, Sunday, 13:00 PM ~ 14:50 PM)

Moderator: Chia-Chi Chiu, Ph.D., National Taipei University of Technology, Taiwan

Moderator: Lalit Borana, Ph.D., Indian Institute of Technology Indore, India

- 302 *Investigation on the Mechanical Properties of Low Plasticity Clay Contaminated with Engine Oil*, Khalid Riyadh Omar, Behzad Fatahi, and Lam Dinh Nguyen, **Australia**
- 590 *Effect of stress path and history on the small strain stiffness of calcareous sand*, Jinquan Shi, Wim Haegeman, **China**
- 422 *Experimental Investigation of Long-Term Behaviour of Fly Ash Blended Indian Black Cotton Soil*, Moirangthem Johnson Singh, Weiqiang Feng, Dong-Sheng Xu, Lalit Borana, **India**
- 000 *Evaluation of high temperature performance indexes of anti-rutting asphalt mixture*, Mingliang Zhang, Jiupeng Zhang, Guojing Huang, Qinggang Wang, Pingchuang Wei, **China**
- 321 *Used Paper Fibers for Sustainably Enhancing the MICP Stabilization of Sand*, Meiqi Chen, Sivakumar Gowthaman, Kazunori Nakashima, Shin Komatsu, and Satoru Kawasaki, **Japan**

Session 2: Materials I (September 19th, Sunday, 14:00 PM ~ 15:50 PM)

Moderator: Behzad Fatahi, Ph.D., University of Technology Sydney, Australia

Moderator: Meng-Chia Weng, Ph.D., National Chiao Tung University, Taiwan

- 006 *Mechanical behavior of SMA 8 modified with nano hydrotalcite*, João Crucho, José Neves, André Pedro, **Portugal**
- 304 *Relationship between the Mechanical Behavior and Microscopic Properties of Gravelly Soil by Using DEM*, Thi Kim Thoa Ho, Meng-Chia Weng, **Taiwan**
- 498 *The freezing characteristic curve (SFCC) and frost heave test of a Hokkaido volcanic soil*, Junping Ren, Shoulong Zhang, Tatsuya Ishikawa, Sai K. Vanapalli, **Japan**
- 747 *Effect of Using Copper Tailings as Replacement of Fine Aggregate for Concrete Pavement*, Meng-Yao Gao, Sung-Ching Chen, Wei-Ting Lin, **China**
- 603 *Liquefaction Properties of Two Types of Sandy Soil Specimens with Different Compaction Thickness*, Tomoko Sasaki, Shima Kawamura, Junichi Koseki, **Japan**

Session 3: GeoTech I (September 19th, Sunday, 13:00 PM ~ 14:50 PM)

Moderator: Anand Tapase, Ph.D., Karmaveer Bhaurao Patil College of Engineering, India

Moderator: Meng-Chia Weng, Ph.D., National Chiao Tung University, Taiwan

- 658 *Comparative evaluation of Morphometric Parameters on Runoff Estimation of Savitri Watershed*, India, Sudarshan Bobade, Arun Dhawale, Vaibhav Garg, Dr. Anand Tapase, Digvijay Kadam, N. K. Patil, **India**
- 215 *The Design Parameters and Quality Requirements of Jet Grout Columns in the Stabilization of a Sloping Bermed Excavation*, Arthur K O So, **Hong Kong**
- 369 *Simulation of rock hydraulics in rock joint by using discrete element method*, Chia Chi Chiu, Meng Chia Weng, **Taiwan**
- 306 *Invert anomalies and countermeasures of railway tunnel in horizontal layered rock mass*, Linyi Li, Junsheng Yang, Lichuan Wang, Shuying Wang, **China**
- 000 *Study on blast vibration characteristics and its safety control measures in the excavation of multi-arch tunnel without middle wall*, Qidong Gao, **China**

Session 4: GeoTech II (September 19th, Sunday, 14:00 PM ~ 15:50 PM)

Moderators: Yutao Pan, Ph.D., Norwegian Uni. of Science and Technology, Norway

- 216 *Performance of the Jet Grouted Sloping Berm as a Support to the Diaphragm Wall in an Excavation*, Arthur K O So, **Hong Kong**
- 271 *A semi-analytical model for a compaction-grouted soil nail with grout bulb*, LI Yu , YE Xin-yu , PENG Rui , ZHANG Sheng, **China**
- 560 *Impacts of Pile Foundation Arrangement on Seismic Response of LNG Tanks Considering Soil-Foundation-Structure Interaction*, Noor Sharari, Behzad Fatathi, Aslan Hokmabadi, Ruoshi Xu, **Australia**
- 309 *Deformation Behaviors and Control Measures of tunnels in Jointed and Altered Granite Rock mass with High Ground Stress: A case study*, Xinghua Fang, Junsheng Yang, Xuemin Zhang, Linyi Li, Yipeng Xie, **China**
- 560 *Resiliency of Power Grid Infrastructure under Extreme Hazards - Observations and Lessons Learned from Hurricane Maria in Puerto Rico*, Shen-en Chen, Miguel A. Pando, Agustin A. Irizarry, Yamilka Baez-Rivera, Wenwu Tang and Yenki Ng, **USA**

Session 5: Pavements (September 19th, Sunday, 9:00 PM ~ 12:00 AM)

Moderator: Zahid Hossain, Ph.D., Arkansas State University, USA

Moderator: Anand Tapase, Ph.D., Karmaveer Bhaurao Patil College of Engineering, India

- 248 *Process for the development of a Digital Twin of a local road – a case study*, Wynand JvdM Steyn, André Broekman, **South Africa**
- 182 *Conservation planning of road construction raw materials - Satara a case study*, Anand B. Tapase, Sabir S. Sayyed, Nagendra Patil , Digvijay Kadam, Ajay Shelar , Ravindra P. Patil, **India**
- 961 *IMPULSE COMPACTION: History, Technic and Examples*, Michael Bißmann, Alexandru Tomozei, **Austria**
- 781 *Using PSO-SVR algorithm to Predict the Asphalt Pavement Performance*, Zhe Li, Jiupeng Zhang, Tao Liu, Yichun Wang, Jianzhong Pei, Pei Wang, **China**
- 281 *Comparative Investigation on the Curing Behavior of GS-Stabilized and Cemented Soils at Macromechanical and Microstructural Scales*, X. Chen, F. Yu, Z. Hong, L. Pan, X. Liu, Y. Li, **China**
- 382 *Performance Evaluation of fiber-reinforced expansive subgrade soil stabilized with Alkali Activated Binder, Lime, and Cement: A comparative study*, Mazhar Syed, Anasua GuhaRay, Ankit Garg, **India**
- 179 *Unsupervised Learning of Pavement Distresses from Surface Images*, Ahmad Abdelmawla, S. Sonny Kim, J. James Yang, **USA**
- 000 *Design and evaluation of light-transmitting concrete (LTC) using waste tempered glass A novel concrete for future photovoltaic road*, Yan Li, Jiupeng Zhang, Yuanbo Cao, Qinshi Hu, Xiaodong Guo, **China**



PUBLICATIONS

Tapase (Eds), Infrastructure Sustainability Through New Developments in Material, Design, Construction, Maintenance, and Testing of Pavements. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79644-0>

Khabbaz (Eds), Smart and Green Solutions for Civil Infrastructures Incorporating Geological and Geotechnical Aspects. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79650-1>

Fatahi (Eds), Resilient Design and Construction of Geostructures Against Natural Hazards. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79854-3>

Yang (Eds), Advanced Tunneling Techniques and Information Modeling of Underground Infrastructure. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79672-3>

Neves (Eds), Advanced Geotechnical and Structural Engineering in the Design and Performance of Sustainable Civil Infrastructures. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-80155-7>

Kim (Eds), Advances in Urban Geotechnical Engineering. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-80152-6>

Shu (Eds), Advances in Geotechnical Engineering & Geoenvironmental Engineering. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-80142-7>

An (Eds), New Approaches of Geotechnical Engineering: Soil Characterization, Sustainable Materials and Numerical Simulation. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79641-9>

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Liu (Eds), Advances in Innovative Geotechnical Engineering, GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-80316-2>

Steyn (Eds), Transportation Infrastructure Engineering, Materials, Behavior and Performance. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79857-4>

Hossain (Eds), Finding Solutions of the 21st Century Transportation Problems Through Research and Innovations. GeoChina 2021 (Sustainable Civil Infrastructures)

- <https://link.springer.com/book/10.1007/978-3-030-79638-9>

Yao (Eds), Developments in Sustainable Geomaterials and Environmental Geotechnics. GeoChina 2021 (Sustainable Civil Infrastructures)

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