# TBM-DiG 2019 Conference Program

## Wednesday Nov. 13<sup>th</sup>

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Location</th>
<th>Note</th>
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<tbody>
<tr>
<td>800-1500</td>
<td>Registration for the conference</td>
<td>Sheraton Hotel</td>
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<tr>
<td>800-1400</td>
<td>Site visit to Eisenhower Tunnel and Loveland Pass</td>
<td>Leaving Sheraton Hotel and returning back to hotel</td>
<td>For guests registered for the site visit</td>
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<tr>
<td>1400-1500</td>
<td>Meeting time at Hotel Lobby</td>
<td>Rest for participants of the Eisenhower tour, preparation for campus tour</td>
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<tr>
<td>1500-1800</td>
<td>Tour of Campus, Colorado School of Mines Earth Mechanics Institute</td>
<td>Leaving Hotel at 3 pm to CSM campus</td>
<td>Bus will be provided to CSM campus</td>
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<tr>
<td>1800-20:00</td>
<td>Dinner Reception at Mines Geology Museum</td>
<td>Geology Museum</td>
<td>Bus will be provided to return to hotel</td>
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## Thursday Nov. 14<sup>th</sup>

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker</th>
<th>Title</th>
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<tbody>
<tr>
<td>8:30-10:00</td>
<td>Opening and Keynote Session I</td>
<td>Jamal Rostami (CSM)</td>
<td>Welcome and introduction</td>
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<tr>
<td></td>
<td>Moderator: Robert Galler (Austria)</td>
<td>Jian Zhao, Monash Univ., Australia</td>
<td>TBM-DiG trilogy and history</td>
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<td></td>
<td>Alan Howard (USA)</td>
<td>Lok Home, President, The Robbins Company</td>
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<td>Wang Dujuan, Chief Technical Officer, China Railway Equipment Group (CREG)</td>
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<tr>
<td>10:00-10:30</td>
<td>Break</td>
<td>Conference Lobby and Exhibition Area</td>
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<tr>
<td>10:30-12:10</td>
<td>Technical Session 1: Mixed Ground 1</td>
<td>Chairs: Brian Fulcher (USA), Dae Yong Kim (Korea)</td>
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<tr>
<td></td>
<td>20 Minute presentations</td>
<td>Del Nero, Hunt</td>
<td>Two Decades of Advances Investigating, Baselining and Tunneling in Bouldery Ground</td>
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<td></td>
<td></td>
<td>Baeppler</td>
<td>VARIABLE DENSITY TBM – latest state of technology</td>
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<tr>
<td></td>
<td></td>
<td>Gonzalez</td>
<td>Challenge in determining natural stress in hard soil soft rock (HSSR): An Example in the project of extension subway tunnels in Toronto.</td>
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<tr>
<td></td>
<td></td>
<td>Nilsen</td>
<td>Significance of Mixed Face Conditions in hard rock TBM-tunneling</td>
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<tr>
<td></td>
<td></td>
<td>Fang</td>
<td>FIELD PERFORMANCE AND NUMERICAL SIMULATION OF SPB TBM TUNNELLING IN SANDY COBBLE SOILS</td>
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<tr>
<td>10:30-</td>
<td>Technical Session 2: New Technology</td>
<td>Chairs: Dean Brox (UK), Yong Fang (China)</td>
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<tr>
<td>Time</td>
<td>Session</td>
<td>presenter(s)</td>
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<tr>
<td>12:10</td>
<td>20 Minute presentations</td>
<td>Nix</td>
<td>Magnetic Seal for High Angle Conveyor Belting</td>
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<td></td>
<td></td>
<td>Bianchi</td>
<td>Assessing rock mass conditions by mean of TBM excavation parameters: some case studies</td>
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<td></td>
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<td>Kawano</td>
<td>Jamming Mechanism on Shield Tunnel Boring Machine</td>
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<td></td>
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<td>Meschke</td>
<td>Computational analysis of cutting-disc-rock interaction in heterogeneous ground conditions</td>
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<td>LI</td>
<td>Dynamic TBM Performance Prediction Method Based on Machine Learning and Advance Geological Evaluation</td>
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<tr>
<td>12:00－</td>
<td>Launch &amp; Poster session 1</td>
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<tr>
<td>13:30－</td>
<td>Keynote Session II</td>
<td>Ulrich Maidl, Maidl Tunnelconsultants</td>
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<tr>
<td>13:30－</td>
<td>Moderator: Jian Zhao</td>
<td>Brian Fulcher, Jacob MCMillan, consulting, Chair of WG-14 of ITA</td>
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<tr>
<td>14:30－</td>
<td>Break</td>
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<tr>
<td>15:00－</td>
<td>Technical session 3: Mixed Ground II conditions (Room)</td>
<td>Chair: Bjorn Nilsen (Norway) , Ahmadreza Hedayat (USA)</td>
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<td></td>
<td>20 Minute presentations</td>
<td>Duhme</td>
<td>Lessons learned from TBM tunneling in Singapore tropical weathered rock formations</td>
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<tr>
<td></td>
<td></td>
<td>Firouzei</td>
<td>Tunneling with a soft rock EPB machine in hard rock conditions, the experience of Tehran metro line 6 southern expansion sector</td>
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<td></td>
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<td>Jeong</td>
<td>Linear cutting tests for assessment of cutting performance of a disc cutter in gravel ground conditions</td>
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<td></td>
<td></td>
<td>yang</td>
<td>Effect of water content on hydrothermal alteration of mudstone during the TBM tunneling</td>
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<tr>
<td>15:00－</td>
<td>Technical session 4: New Technology and Extreme Tunneling (Room)</td>
<td>Chair: Benno Ring (Germany), Hoyoung Jeong (Korea)</td>
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<td></td>
<td>20 Minute presentations</td>
<td>Willis</td>
<td>Effective design and assembly of a large diameter slurry TBM in hard rock conditions</td>
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<td></td>
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<td>Zhang</td>
<td>Application of shield tunneling method for cross passage of urban subway tunnels</td>
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<td></td>
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<td>Chen</td>
<td>Preliminary study on shield steering along a sharp &quot;s&quot; curve</td>
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<td>Khetwal</td>
<td>Sensitivity analysis of effect of</td>
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<td>Time</td>
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<tr>
<td>8:30‐10:00</td>
<td>Opening and Keynote Session III</td>
<td>Werner Burger, Chief Engineer, Herrenknecht AG</td>
<td>SR‐99 Viaduct Replacement tunnel in Seattle.</td>
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<td>Moderator: Lars Longmaak (Germany)</td>
<td>Brian Russell, HNTB</td>
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<tr>
<td>10:00‐10:30</td>
<td>Break</td>
<td>Conference Lobby and Exhibition Area</td>
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<tr>
<td>10:30‐12:00</td>
<td>Technical Session 5: Long and Squeezing tunnels (Room)</td>
<td>Chairs: Xiao-Ping ZHANG (China), Gabriel Walton (USA)</td>
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<td></td>
<td>20 Minute presentations</td>
<td>Ring</td>
<td>DESIGN OF SEGMENTAL LINING IN DIFFICULT ROCK CONDITIONS</td>
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<td></td>
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<td>Peach</td>
<td>TBM s meeting the challenge of soft ground faults and rock bursts in the Himalayas</td>
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<td>Arora</td>
<td>A miniature tunnel boring machine for simulating tunnel excavation in squeezing ground conditions</td>
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<td>Hinton</td>
<td>Comparison of look-ahead probe drilling, TBM data, and probe-hole geophysics at the Rondout West-Branch Bypass Tunnel</td>
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<td></td>
<td>Feng</td>
<td>Application of Two Types of Cutter Rings with Different Materials in Gaoligong Mountain Project</td>
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<tr>
<td>10:30‐12:00</td>
<td>Technical Session 6: Hard Rock Tunneling Challenges (Room)</td>
<td>Chairs: Yang Zheng (China), Hervé GOUJON (France)</td>
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<tr>
<td></td>
<td>20 Minute presentations</td>
<td>Robert Galler</td>
<td>Disk cutter force measurement, face monitoring and real time analysis of excavated materials in TBM tunnelling</td>
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<td>Willis</td>
<td>TBM tunneling in extremely hard rock</td>
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<td>Kim</td>
<td>Hard rock TBM cutter life and wear evaluation: experience of new abrasion test (NAT) in Juam Hydro tunnel</td>
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<td>12:00-13:30</td>
<td>Launch &amp; Poster session 1</td>
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<tr>
<td>13:30-15:00</td>
<td>Technical session 7: Soft Ground Tunneling Challenges</td>
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<td>15:00-15:30</td>
<td>Break</td>
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<tr>
<td>15:30-17:00</td>
<td>Keynote Session IV, Closing and Awards Ceremony</td>
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<tr>
<td>17:00</td>
<td>Adjourned</td>
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<td>16:00</td>
<td>Dinner Reception and Networking</td>
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End of the Conference.

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<tr>
<th>Speaker</th>
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<tbody>
<tr>
<td>Garshol</td>
<td>Ground water control measures in hard rock TBM-tunneling</td>
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<tr>
<td>Narimani Dehnavi</td>
<td>Evaluating the efficiency of a new cutterhead design to counteract the drawbacks of excavation through very hard rocks (presented by R. Narimani)</td>
</tr>
<tr>
<td>Salimi</td>
<td>Development of a new models for prediction of TBM performance in hard rock condition based on rock type (presented by J. Rostami)</td>
</tr>
<tr>
<td>Zhang</td>
<td>Key technologies for efficient construction of Sutong GIL Yangtze River Crossing Cable Tunnel - the first underwater 1000 kV ultra-high-voltage (UHV) power transmission line in the world</td>
</tr>
<tr>
<td>Turner</td>
<td>Thames tideway central and west material handling systems from TBM to barge</td>
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<tr>
<td>Hu</td>
<td>Design of a large-scale rheometer for application in EPB TBM tunneling</td>
</tr>
<tr>
<td>Wang</td>
<td>Fluidity characteristics of conditioned gravely and a new evaluation method</td>
</tr>
<tr>
<td>Fang</td>
<td>Study on soil conditioning for EPB shields by permeability tests</td>
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<tr>
<td>Dreyer</td>
<td>Tunneling on the moon by Lunar TBM,</td>
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<tr>
<td>Rostami</td>
<td>Closing Remarks and Presenting the awards</td>
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<td>Next TBM-DIGs Conference Announcement</td>
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