The 6th "Short-term Predication of Rock Failure" Competition

(Notice No.1)

August 7-10,2026 Hong Kong, China

The prediction and forecasting of major natural and engineering disasters in rock mass systems—including earthquakes, landslides, rock bursts, and gas outbursts—remains one of the most challenging problems in scientific research. Professor Zhao Yangsheng, an academician of the Chinese Academy of Sciences and a researcher at Taiyuan University of Technology, has proposed the simplified scientific concept of "the short-term prediction of rock failure " based on systematic research into these disaster mechanisms. He advocates promoting coordinated innovation and rapid development in this field through competitions. Theoretical explorations, methodological innovations, technological advancements, and monitoring instrument development related to this issue are expected to continuously enhance the scientific level of predicting major natural and engineering disasters in rock mass systems, gradually achieving practical engineering applications. This holds significant scientific and practical value for global disaster prevention and mitigation efforts.

The competition encompasses three key components: (1) the time of rock failure, (2) the elastic energy released at the moment of rock failure, and (3) the location and mode of rock failure. This competition features distinct characteristics: a) Objective and verifiable results; b) A blend of scientific cutting-edge research and engineering applicability; c) A highly challenging process; d) A unified platform for comparing the performance of various theories, methods, and monitoring instruments. To date, no international competition has been organized under the same loading test conditions, where multiple teams simultaneously predict rock failure using different theories, methods, and monitoring technologies for comparative evaluation. The first five editions of the competition brought together high-level research teams from around the world, systematically comparing the strengths and weaknesses of their proposed rock failure prediction theories, methods, technologies, and monitoring instruments. This initiative has facilitated academic exchange and mutual learning, playing a positive role in advancing rock failure prediction research and even the development of major disaster prediction for rock mass systems.

Since its inaugural edition in October 2021, this competition has successfully held five editions. The first four were hosted by Taiyuan University of Technology, while the fifth took place at the Changjiang River Scientific Research Institute. Due to venue and experimental constraints, each edition selects approximately 15 teams from the applicant pool, with participants primarily coming from universities and research institutes worldwide engaged in rock mechanics and related fields.

To further integrate short-term rock failure prediction methods with the prevention of geological hazards such as landslides, debris flows, earthquakes, and volcanic eruptions, and to advance the development of monitoring technologies for geological disasters, this competition is jointly organized by the ISRM Commission on Ultradeep Rock Mass Mechanics and Engineering and the International Consortium on Geo-Disaster Reduction (ICGdR). We cordially invite research teams worldwide specializing in rock mechanics and related fields to actively participate in this competition, fostering the continuous advancement of rock mass disaster prediction theories and technologies through collaboration.

The relevant matters are hereby notified as follows:

1. Organizational Unit

host unit：

ISRM Commission on Ultradeep Rock Mass Mechanics and Engineering

International Consortium on Geo-Disaster Reduction

organizer ：

The Hong Kong Polytechnic University

Taiyuan University of Technology

co-organizer ：

Key Laboratory of In-situ Property-improving Mining of Ministry of Education

Shanxi Society of Rock Mechanics and Engineering

2. Academic Committee

Director: Zhao Yangsheng

Deputy Directors: Li Shucai, Pan Yishan, Wang Fawu

Members (alphabetical order): Feng Tao, Feng Zengchao, Huang Lixing, Huang Hongwei, Ji Hongguang, Ki-Bok Min, Li Ning, Li Xiao, Li Xibing, Liu Xinrong, Tan Yunliang, Tang Chun'an, Wang Jiachen, Wang Laigui, Wu Aiqing, Yang Qiang, Yang Gengshe, Zhu Wancheng, Zhang Guang

3. Organizing Committee

Director: Pan Yishan

Deputy Directors: Wang Fawu, Zhao Qi, Feng Zengchao

Members: Chen Guoxu, Shu Weiwei, Wang Guodong, Wu Siyuan, Lü Zhaoxing, Shen Yongxing, Song Yimin

4. Competition Schedule

4.1 Competition Venue:

China · Hong Kong The Hong Kong Polytechnic University

4.2 Competition Content:

The participating teams shall conduct real-time monitoring of rock uniaxial compression tests under constant displacement rate loading conditions, based on their respective theoretical frameworks, analytical methodologies, and testing technologies. Prior to rock sample failure, the following aspects shall be predicted:

1) Time of the rock sample failure

2) Location and morphology of the main fracture surface of the sample

3) Elastic energy released at the moment of the sample fracture

Teams must submit their forecast results and supporting materials within the specified timeframe. The supporting materials should include, but are not limited to: forecasting principles, monitoring equipment, data processing methods, calculation basis, computational procedures, and final results.

4.3 Competition Test Conditions:

Loading conditions: Constant displacement rate loading.

Sample dimensions: 150mm×150mm×300mm cuboid

Sample lithology: Granite and Sandstone

4.4 Test and Competition Procedures:

1) Place the sample on the testing machine and apply a predetermined preload;

2) Each participating team shall install sensors and testing instruments, provided that the installed equipment must not interfere with other teams' testing (Special Note: The use of sensors emitting electromagnetic or vibration signals is strictly prohibited).

3) After the installation of the equipment, the testing machine continuously loads at a constant displacement rate. All participating teams use their respective devices to simultaneously monitor the physical and mechanical information during the deformation and damage evolution of the rock in real time.

4) During the continuous loading process, the participating teams predict the sample's failure time, main fracture surface, and the released elastic energy based on the physical and mechanical data obtained from the monitoring device, and submit their predictions in times.

5) The testing machine shall maintain continuous loading until the specimen fails, and the participating team must record all relevant monitoring data throughout the test.

6) The judging panel determines the standard answer according to the accurate failure time, load-displacement curve, displacement-time curve recorded by the testing machine, and the sketch of the main fracture surface is given after the failure of the rock sample.

7) Each participating team must independently complete the failure prediction for one granite and one sandstone sample, and submit complete supporting documents within 2 hours after the second sample test.

8) The judging panel will conduct a comprehensive evaluation based on the prediction results and supporting documents submitted by each participating team.

4.5 Team Composition:

All units (universities, research institutes, and national key laboratories) may form teams independently or jointly with up to three units.

Teams from different countries or regions are especially encouraged to participate together.

Each participating team consists of three members, with at least one being a non-student, while the other members have no restrictions on academic qualifications or professional titles.

During the competition, only the participating team members are permitted to operate the instruments, process the data, and submit the predicted results on-site.

4.6 Competition Rules:

1) The organizer is responsible for sample preparation, testing machine operation, and provision of basic test conditions, and shall implement the entire process of uniaxial compression testing. During the competition, the real-time displacement-load and displacement-time curves collected by the testing machine will not be disclosed to participating teams and will be uniformly published after the competition.

2) All participating teams must prepare their own monitoring and prediction equipment, sensors, and computational software, as the organizers will not provide such devices.

3) During the competition, approximately 6-7 teams will simultaneously conduct real-time monitoring on the same sample. Given the constraints of actual engineering monitoring conditions, each team is permitted to install a maximum of 5 sensors (e.g., strain gauges or acoustic emission probes) on the sample's surface, with the maximum linear dimension of any single sensor's contact surface not exceeding 20mm. Drilling holes or injecting fluids into the sample is strictly prohibited. The number and dimensions of externally mounted sensors or non-contact testing devices are unrestricted.

4) All predicted results must be submitted before sample failure occurs. Late submissions will be deemed invalid and result in zero score.

4.7 Evaluation Criteria:

1) Standard Answer Determination Method

The judging panel determined the standard answer based on the load-displacement curve, displacement-time curve and the spatial coordinates of the main fracture surface after the failure of sample.

2) Prediction of failure time (Full score: 50 points)

The time of the sample failure is defined as the time point when the stress-strain curve drops to half of the peak strength. The score is determined by the prediction accuracy and the weighted coefficient of advanced prediction.

3) Prediction of the main fracture plane (Full score: 20 points)

The primary fracture plane is the main crack surface that penetrates the specimen and causes ultimate failure. The judging panel scores the similarity between the fracture plane diagrams submitted by participating teams and the actual fracture plane, and the average score of all judges' evaluations is taken.

4) Energy Prediction (Full Score: 20 points)

The energy is defined as the elastic strain energy accumulated before the peak strength. The score is calculated as the ratio of the predicted value to the standard answer multiplied by the total score of this item.

5) The weighting value ξ of the supporting documents ($0 \leq \xi \leq 1$)

The supporting documents must provide scientific evidence for the three aforementioned predictions. A score of 1 is awarded for logical clarity and correct methodology, while 0 is given for failure to support or provide documents. The final weighted score is calculated as the average of all judges' ratings.

6) Project Implementation Feasibility (Full score: 10 points)

The supporting documents must demonstrate the application potential of the adopted methods in predicting engineering disasters such as earthquakes, landslides, and rockburst, which will be evaluated by the judges.

7) Award Settings

The top three rankings are determined by total scores, with an additional 'Time Forecasting Special Award' recognizing the top three performers based on predicted failure time.

5. Key Time Points

- July 10, 2026: Deadline for registration form submission

- July 20, 2026: Deadline for notification of eligibility
- August 7, 2026: Team registration and pre-competition preparations
- August 8-9, 2026: On-site competition
- August 10, 2026, the competition test curve was released, and an academic seminars on short-term prediction of rock failure was held.

Please submit the registration form to the competition's designated email: alv-1001@163.com

6. Other Matters

To protect the intellectual property rights of participating teams, this event prohibits non-competitor access to the testing area. All academic documents will be collected after the event.

The right to interpret this event belongs to the organizer.

7. Contact Information

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ISRM Commission on Ultradeep Rock Mass Mechanics and Engineering

April, 21, 2026

Registration Form

Institution		Team Academic Leader			
Information of Participants					
Full Name	Department	Age	Academic Degree	Position	Major
Team Research Achievement					
Person to Contact		Tel		Email	