

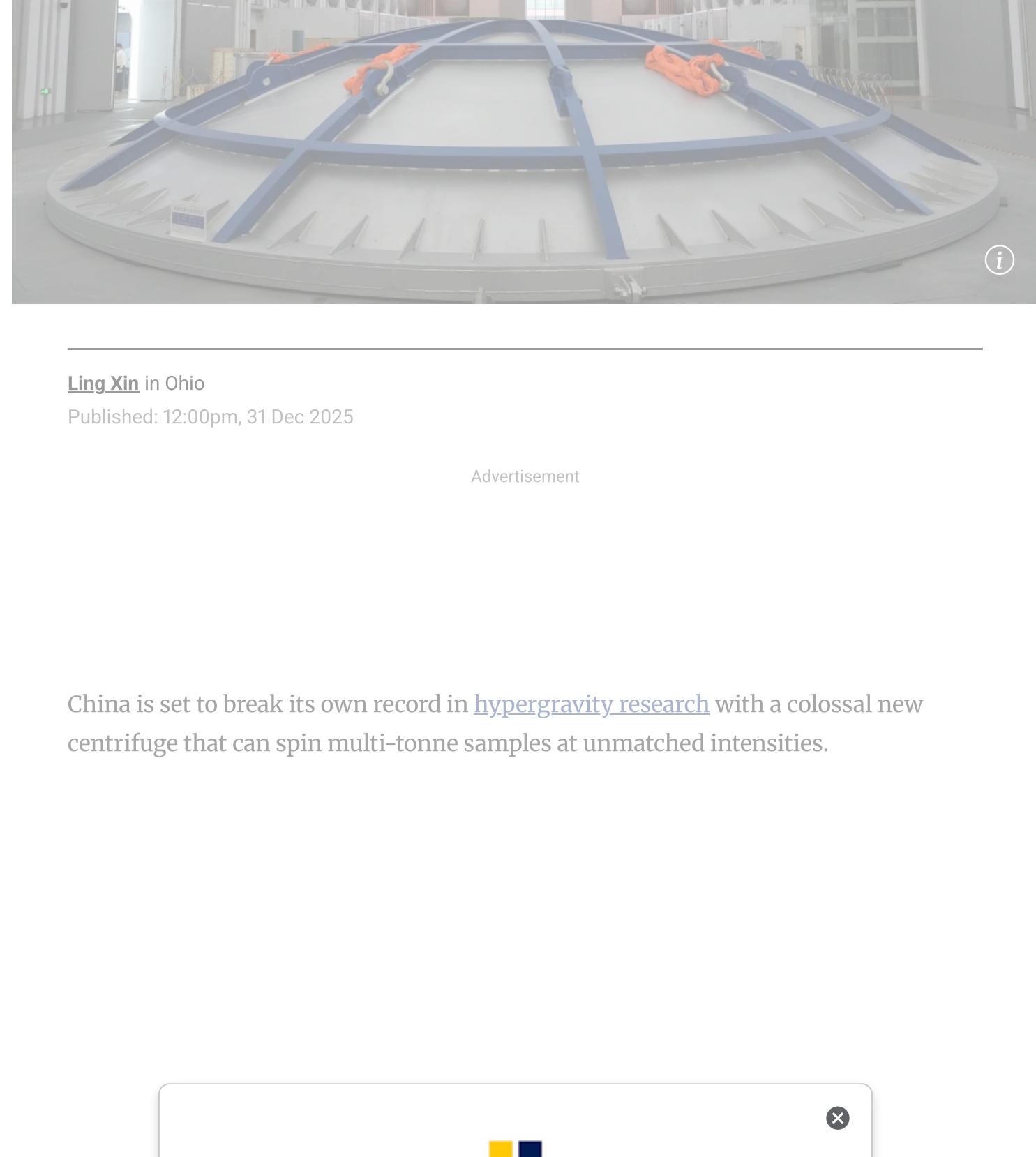
Science China / Science

# China builds a record-breaking hypergravity machine to compress space and time

CHIEF1900 will help to recreate catastrophic events such as dam failures and earthquakes inside a lab, university says

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[Ling Xin](#) in Ohio

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The machine is part of the China Institute of Engineering Research's (CIE) hypergravity facility. It is currently being installed and will be operational by the end of the year. The facility is designed to simulate extreme gravitational forces, such as those experienced during a spin cycle, to study the effects on materials and structures.

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03:00 China launches Shenzhou-21 spacecraft with 4 mice aboard for 6-month experiment

Both machines are part of the Centrifugal Hypergravity and Interdisciplinary Experiment Facility (CHIEF), a national laboratory 15 metres (49 feet) beneath the university campus to minimise vibration and ensure stable operation.

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CHIEF1300 dethroned the long-time record holder operated by the US Army Corps of Engineers in Vicksburg, Mississippi, which has a capacity of around 1,200 gtonne. That is in contrast to a household washing machine which rarely exceeds 2 gtonne during a spin cycle.

Approved in 2021 with a budget of 2 billion yuan (US\$285 million), the CHIEF complex is part of China's broader effort to expand cutting-edge research infrastructure and promote international collaboration. The facility is open to users from universities, research institutes and industries – both domestic and overseas.

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All objects on Earth are subject to gravity and the centrifugal force induced when spinning. By generating forces hundreds or thousands of times stronger than Earth's gravity, machines such as CHIEF can compress time and distance, making it possible to study phenomena that would otherwise take decades or span kilometres, all within a lab.

For example, to assess the structural stability of a dam 300 metres (984 feet) tall, scientists can build a three-metre model and spin it at 100g. This replicates the same stress levels the full-scale dam would experience in the real world.

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Ling Xin

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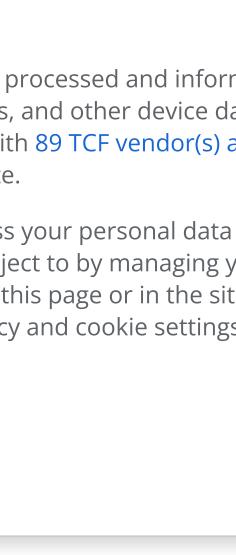
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