'Mathematics Gives Meaning to Life'

Dialogue

By Staff Reporters

The moment a mathematician receives the Fields Medal, their inbox crashes and their private life suddenly becomes public property. Yet while the medal creates a dazzling public spotlight, famous mathematician and Tsinghua University professor Caucher Birkar, who won the prize in 2018, sees a remarkably practical side to it.

While calling the honor "one of those exceptional things that can happen to anyone," he explained that it provides him a platform to communicate ideas more easily, especially to the general public, because he becomes a reference point. It makes him busier, he admitted, but overall, it's positive because he can effect change more easily than before.

Professor Caucher Birkar. (COURTESY PHOTO)

The village boy who demystified genius

Long before the medal, Birkar grew up in a remote Kurdish village in Iran, drawn to mathematics by an elder brother. "I liked mathematics from primary school, partly due to my older brother, who was also interested in math and technology," he said. "I started learning from him, then read a lot on my own, and got deeper into it." He described finding many interesting things in mathematics, whether learning it, coming up with new ideas, or solving problems. "It became an enjoyable way of life, much like people enjoy sports."

This personal joy forms the bedrock of his philosophy. "Personally, mathematics gives meaning to life," he said. "It's a journey of passion and pleasure, and you feel you're doing something valuable. That personal drive is essential for success." When asked if one needs to be born with a special gift to be a mathematician, Birkar's answer is remarkably grounded: Not every businessperson becomes the richest, but many succeed. If someone has a passion, they should follow it. "Almost anyone can become a mathematician, but the goal is not to be the best in the world; it's to do your best."

This conviction is rooted in his own life. Moving from a village school to a city high school was intimidating. "When I moved to the city for high school, I thought I couldn't compete with city students," he admitted. "But I soon realized they were just like me, nothing special."

The same thing happened when he went to university in the capital. From this experience, he offers a message to students in remote areas today. "It's about you, your books, and your study. It doesn't matter where you come from."

Mapping the unseen landscape

Birkar's intellectual home is algebraic geometry, a field so abstract that he acknowledges how hard it is to explain his work to the public. "Mathematics has its own language," he said. His domain is the study of spaces defined by polynomial equations, the kind most people know from high school. Instead of simply solving those equations, he and his colleagues study the spaces of their solutions. He likened the process to grouping people by gender, age, or wealth, categorizing these spaces and seeing how they relate. His specific work focuses on describing their properties, exploring how many spaces belong to a group and how they interact.

His move to Tsinghua has not altered the fundamental nature of this research. "The research and teaching themselves will be the same; my projects won't change," he confirmed. What differs is the potential for new collaborations. He expects to communicate more with colleagues here, including those outside the field of mathematics. While algebraic geometry already has deep connections with theoretical physics, Birkar sees emerging links in cryptography, biology, chemistry, and computer science. Though he hasn't worked in applied directions himself, he remains open to surprise. "Talking to someone might spark new ideas," he said.

From looking up to lifting others

To understand what the Fields Medal truly means to Birkar, one has to go back to his student days in University of Tehran. He would look up at pictures of Fields Medal winners on the walls of his math club, wondering if he would ever meet one. At that time in Iran, he couldn't even imagine going to the West. The distance between a Kurdish village boy and those icons on the wall felt unbridgeable until it wasn't.

Now, that same boy has chosen to write his next chapter at Tsinghua University in Beijing. His arrival is not a sudden leap but a considered step. He had visited in 2017 and again in 2019 for a conference, staying for more than two weeks. "Before I received the invitation, I was already in contact with Tsinghua," he said. "So I had some familiarity with the university and knew some people here."

What drew him back was both academic strength and something more personal. "Tsinghua is a very strong university, attractive from a mathematical point of view," he said. "But also, I wanted to experience a different culture and a different way of life in China."

His first impressions have been warm. "My impression of Tsinghua and of people in China is that they are very welcoming and hospitable. I really like that." He also appreciated the logistical ease. "They make practical things easy. So I don't have to worry about small matters."

My China Story

A Cameroonian Witness to China's Technology for People

By LONG Yun & QIN Mian

Kenne Michel Olivier arrived in China from Cameroon with a student's curiosity and a wallet full of cash. Today, the wallet has become a relic, but his curiosity remains. The young scholar has become a witness to a defining feature of China's development: technology that works for the people.

"I rarely need to carry cash," said Olivier, now a lecturer at Tianjin University's School of Foreign Languages. "Whether buying food at a small street market, taking a taxi, paying utility bills, or shopping in a supermarket, everything is done with a QR code. This has made my daily life much more convenient and efficient."

It may sound like a small thing, but for Olivier, this simple fact captures something profound about China's technological rise.

Innovation empowers daily life

Regarding the concept of science and technology serving the people, he is deeply impressed by how innovation is closely connected with improving people's daily lives. "Rather than developing technology only for economic growth, China has made remarkable efforts to ensure that technological progress directly benefits the people," he said.

Beyond mobile payment platforms like Alipay and WeChat Pay, another technology has redefined his experience: the high-speed railway network. "The high-speed trains are punctual, comfortable, affordable, and environmentally friendly," he said. What impresses him even more is the integration of digital technologies, as ticket booking, seat selection and identity verification can all be completed through mobile applications, making long-distance travel extremely convenient.

Olivier has also observed the rapid development of smart public services. Many administrative procedures that once required in-person visits to government offices can now be completed online, from healthcare to transportation. For him, being advanced and practical are two major characteristics of China's scientific and technological achievements, which, he believes, "make society more efficient, convenient and inclusive."

Olivier finds these technologies demonstrate how innovation can be used to improve people's quality of life on a large scale. "They also offer valuable experiences that (other) developing countries can learn from when promoting digital transformation and inclusive development," he said.

A bridge for shared development

Olivier notes that while pursuing development, China also shares its scientific, technological and educational resources with other countries. His own experience bears this out. As an international student who became a university teacher in China, he has personally benefited from this openness through educational opportunities and academic exchanges. A recipient of a Chinese scholarship himself, he sees investment in education as one of the most sustainable ways to share knowledge and technology.

His perspective extends to tangible China-Africa cooperation. In Cameroon, Chinese companies have helped build telecommunications networks, roads, hospitals, and other public infrastructure. In his view, such cooperation goes beyond construction; it is about sharing development experiences and helping partner countries strengthen their capacities through technology transfer and skill-building.

In his own field of international Chinese language education, Olivier has witnessed similar openness. China supports the localization of language education by training local teachers, developing localized materials, and encouraging collaborative research with overseas universities. His own research on Chinese language teacher training in Cameroon has been inspired by these initiatives, which he says contribute to sustainable educational cooperation.

This young scholar believes that China seeks to share its achievements to promote mutual development and long-term partnerships. This openness, he adds, has strengthened people-to-people exchanges and fostered greater international collaboration.


The high-speed railway from Xi'an, Shaanxi province to Shiyan, Hubei province opens on June 30. (PHOTO: XINHUA)

High Stress, Poor Sleep and Unhealthy Diet Hurt Immune System

Science Outreach

By Staff Reporters

Recently, a resident of Chengdu city in southwest China used AI tools to create an intense weight-loss plan. He lost 20 kilograms in 45 days, and then fell into a sudden coma. When he was rushed to the ICU, doctors diagnosed him with multiple organ dysfunction syndrome: A combination of chronic sleep deprivation, irregular eating habits, and high-intensity exercise had disrupted his immune system.

Why does the immune system become dysregulated? How can people scientifically safeguard their immunity? *Science and Technology Daily* spoke with experts about this topic.

"The immune system is like a defense force within the human body. Under normal conditions, it identifies and eliminates harmful agents, such as viruses and bacteria, without attacking the body's healthy cells and tissues," said Dr. Li Junti, director and chief physician of the Department of Traditional Chinese Medicine Hematology at the 970th Hospital of the People's Liberation Army (PLA) Joint Logistics Support Force.

When problems arise within this "force," they typically manifest in three ways. The first is "insufficient manpower": Immune function is low, and bodily resistance drops, making one prone to recurrent colds and slow wound healing. The second way is "overzealous defense": The immune response is excessive, causing immune cells to attack normally harmless substances, such as pollen or dust mites. This condition is commonly known as an allergy. The third way is "inability to distinguish friend from foe": The immune system mistakenly identifies the body's own tissues as "enemies" and attacks them. This can potentially trigger autoimmune diseases.

Dr. Li added that serious complications resulting from immune dysregulation, such as myocarditis, interstitial pneumonia, and nephritis, can be life-threatening if not treated promptly.

Unhealthy lifestyle choices play a significant role in the immune system dysfunction. When immune system issues arise, many people's first instinct is to try to "boost immunity." However, Dr. Zhang Huanping, director of the Department of Allergy and Immunology at Shanxi Bethune Hospital, pointed out that maintaining immune system balance is more important than simply boosting immunity. She suggested focusing on the following areas:

First is emotional management. Persistent psychological stress places a heavy burden on the immune system. Practices such as meditation, yoga, deep breathing, and listening to music can help alleviate stress and foster a positive, stable mindset.

Second is ensuring adequate, high-quality sleep. Getting seven to eight hours of high-quality sleep each night and avoiding staying up late are crucial.

Third is maintaining balanced nutrition. Try to eat a mix of whole foods in the right proportions: fill half your plate with fruits and vegetables, one-quarter with lean proteins, and one-quarter with whole grains, while staying hydrated with water and limiting processed foods, added sugars, and unhealthy fats.

"There are no shortcuts to maintaining immune system balance," said Dr. Zhang. Leading a regular lifestyle, practicing scientific prevention, using medication rationally, and seeking timely medical attention when discomfort arises are the most practical and effective ways to protect the immune system.

Reusable Rocket: More than One Technical Path

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Dong Kai, deputy chief designer of the Zhuque-3, said the cost of the rocket's stainless steel raw materials and manufacturing was about one fifth of those of aluminum alloy. Stainless steel parts offer higher forming efficiency and better material utilization, making the material more suitable for large-scale industrial applications.

While there are reasons for stainless steel's popularity, aluminum alloy will also not be discarded.

Landing legs or net-capture recovery?

Various launch vehicle recovery approaches have been explored internationally. They include parachute, horizontal and vertical recovery. At present, vertical recovery is the dominant approach worldwide, with the Falcon, New Glenn, Long March 10B and Zhuque-3 all adopting vertical recovery.

The deployable landing leg solution used by the Zhuque-3 was verified hundreds of times by the Falcon 9, offering a clear technical pathway and a high degree of engineering certainty. It can meet the demands of high-frequency reuse but the thrust-control precision and the landing cushioning system requirements are very stringent.

The requirement for the landing site is relatively low, so is the cost of its construction and maintenance. Shen Chao, deputy commander-in-chief of the Zhuque-3, said the square landing pad at the Zhuque-3 recovery site measures less than 400 square meters. A control area has been built at the rear of the site to support telemetry, tracking and command throughout the rocket's return and landing, as well as post-landing processing.

On the other hand, the Long March 10B used China's proprietary sea-based net-capture and recovery technology with high load-bearing and buffering capacity. High-altitude cables to arrest the descending rocket were deployed on a seaborne platform. When the rocket descended to a certain altitude, its onboard cable-catching mechanism was caught by four cables arranged in a cross-shaped configuration, completing the capture and recovery.

Compared with other vertical recovery approaches currently in use, net capture and recovery is more accommodating of rocket landing requirements in several respects. The rocket does not need to be equipped with landing legs, thereby simplifying its structure and reducing the weight.

Also the system has greater tolerance for deviations in the rocket's landing point, as the net-based system can effectively expand the capture window and improve the success rate of capture and buffering.

Finally, the recovery system can be designed as a series of standardized configurations to accommodate rockets of different sizes.

The drawbacks are also obvious: Not everyone can build — or afford to build — such a complex and massive recovery platform.

Chinese-built Solar Project Energizes Northern Laos

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The project's environmental footprint was a central concern from the outset. Developers pledged to avoid all residential land, rice paddies, and primary forests — a commitment they say was fully honored. Through design adjustments, including raised panel brackets and optimized foundation layouts, the actual land disturbance was reduced by 1,565 hectares from initial plans.

Construction techniques minimized soil and vegetation disruption. Workers used manual drilling instead of heavy excavation and applied careful pouring methods to prevent runoff contamination. Today, the site includes lookout points and flowering pathways that have made it a local attraction.

The project has also delivered direct social benefits. At peak construction, it employed nearly 3,000 local workers. A vocational training program — combining Chinese language instruction with technical skills — has produced nearly 100 certified Lao technicians, 31 of whom have been hired as permanent staff.

Community infrastructure has been upgraded as well. The renovated Muangxay Secondary School, part of CGN's overseas social responsibility project, now boasts a rooftop solar system that cuts the school's electricity bills. Five roads and bridges have been repaired or reinforced, and a hospital in nearby Luang Namtha province had a new operating room and medical equipment.

Souvath Mahavongsanan, Vice Governor of northern Laos' Oudomxay province, said the collaboration has gone beyond power generation. "This is deep cooperation that improves our local economy and industrial ecosystem," he said. "Both sides are benefiting."

A wind-solar hybrid expansion is scheduled to break ground later this year, with biomass and multi-source complementary projects also under consideration as Laos moves to consolidate its role as a clean-energy supplier for Southeast Asia.