



WE Summit 2017

# SHINING A LIGHT ON THE FUTURE

From interstellar travel, to fighting cancer — the 2017 WE Summit, organized by Tencent, China's leading internet service provider and Nature Research, has taken participants on a journey into the future. The summit, with the theme 'Future and Nature', attracted innovative thinkers to Beijing from around the globe to share their visions about how science fiction could become reality.

The WE Summit, initiated by Tencent in 2013, is in its fifth year. It provides a connective platform for scientists, inventors and entrepreneurs to support innovations that address global challenges. "We have already brought together more than 50 top scientists and innovators, delving into the latest science topics of great interest to human future, ranging from space and deep sea exploration to artificial intelligence (AI)," said Edward Cheng, corporate vice president of Tencent. "I hope the WE Summit will become a barometer of technological innovation and a beacon that guides the future of mankind."

## Space exploration for habitable planets

As population expands rapidly, the Earth may soon become too crowded. The search for habitable space beyond our planet is a potential solution. Such exploration is for the sake of future human beings, according to Stephen Hawking, the renowned theoretical physicist and cosmologist. In a video presentation, Hawking introduced his involvement with the Breakthrough Starshot project, which, funded by the Russian entrepreneur, Yuri Milner, aims to deploy small spacecraft that travels at one-fifth the speed of light to explore Alpha Centauri, the closest star system to Earth. Powered by lasers, the tiny nano-spacecraft is expected to reach Alpha Centauri in 20 years, a lot faster than its conventional counterpart. Challenges like high-energy radiation in space, extreme cold, and potential collision with dust grains when travelling at such high speed threaten to damage the nanocraft. Hawking, however, is optimistic

that these obstacles will be overcome by engineering. "This project is the first step towards the grand vision of interstellar travel," he said.

Pete Worden, executive director of the Breakthrough Initiatives and former director of NASA's Ames Research Center, outlined the innovative initiative in more detail. "We want to know if there is life, and then, intelligent life, elsewhere in the universe," said Worden. "Another goal is to explore the possibilities of interstellar travel."

**VISION WITHOUT ACTION IS A DAYDREAM, AND ACTION WITHOUT VISION IS A NIGHTMARE.**

The search for extra-terrestrial life begins within the solar system, where Mars and Enceladus, the sixth-largest moon of Saturn, are considered

the most likely targets. A closer look into our nearest stars is made more likely by the recent discovery of an Earth-like planet around Proxima Centauri. However, travelling there with current technologies may take tens of thousands of years and require incalculable amount of fuel using rocket propulsion. The Breakthrough Starshot project's solution combines gram-scale StarChip, enabled with chip technology, and a light sail approach. A ground-based laser array would send a 100-gigawatt light beam to propel the ultra-light nanocraft, which carry cameras, photon thrusters and communication equipment that allow transmission of images and other data back to Earth. An early version of the StarChip is already launched, said Worden.

In search of intelligent life beyond Earth, the initiative also has a project to detect radio and laser signals from outer space using the world's most powerful radio telescopes. It is the most comprehensive and intensive search to date.

## Conquering cancer and better ageing

Exploration into the extension of human life is just as intense. Kang Zhang, a genomic medicine expert from the University of California, San Diego, presented work by him and his colleagues to combat cancer. In responses to changes in DNA methylation, an epigenetic mechanism that modifies gene functions that occur in early stages of cancer, Zhang developed a liquid biopsy method using circulating tumour DNA methylation as biomarkers. The method enables non-invasive, real-time, early diagnosis of cancer and a whole-picture profiling of the malignancy based on a simple blood sample.

Early diagnosis means early treatment and improved survival. "I hope we can reduce cancer deaths by half by 2027," said Zhang. As whole-blood methylation pattern can also be used to estimate biological age, "we may also extend human life to 150-200 years by manipulating the methylation bio-age clock," he said.

For Stanford University neuroscientist, Tony Wyss-Coray, a key challenge in human rejuvenation is combating brain ageing and neurodegeneration, such as Alzheimer's disease. Inspired by the breakthrough that old muscle can be repaired with young blood, he is working on rejuvenating old brains using young blood. "The blood is essential, as it connects all organs," said Wyss-Coray. His experiments showed that aged mice injected with umbilical cord blood have improved learning and memory.

Now Wyss-Coray hopes to translate his findings to Alzheimer's disease patients. "We still need to identify the key proteins and genes in the blood that affect brain function," he said.

## Implementing ideas for the future

According to Andrew Chi-Chih Yao, a computational theorist



from Tsinghua University, the future is quantum computing. Computing conventionally requires exploring different solutions to find the correct one. Quantum computing, based on the idea of quantum parallelism, allows these searches to be performed simultaneously. "It is like many computers working at the same time, which makes the computing much faster," said Yao. A quantum computer uses subatomic particles, which exist in more than one state at any time. These quantum bits, or 'qubit', store a much larger amount of information, while using less energy compared with its conventional counterparts. Yao's team at Tsinghua are exploring the use of superconductors, ions and diamonds, to make the qubits.

Quantum computing can help solve many problems in physics, chemistry or biology. It also has applications in AI. "The integration of the two is what I'm most excited about," said Yao. "The prospects are unimaginable."

The advancement of AI must be accompanied by

comprehensive understanding, compassion for other people and self-determination capabilities, according to Jingfang Hao, a science fiction writer. "These would be the next steps for AI development," said Hao, who also urged caution about the risk of humans becoming too lazy to think, a real threat posed by AI, Hao believes.

Looking into the future, David Wallerstein, Tencent's chief exploration officer, proposed developing a planetary-scale perspective to collaboratively invest in our Earth's future. He introduced Tencent's efforts to make the Earth more resilient with technological innovations, such as addressing the food security issue by improving analytics to predict and reduce consumption, or tackling traffic congestion by developing aerial transportation with vertical take-off and landing.

Tencent's efforts also include supporting research by working with international partners. Together with Nature Research, it is planning projects to nurture young scientists and disseminate research

discoveries more broadly, as Ed Gerstner, scientific director of Springer Nature, China outlined in his presentation.

Futurist Pablos Holman, urged a forward-looking perspective to make an impact with technological inventions. He and other inventors at Intellectual Ventures Laboratory have been searching for creative solutions to the world's biggest problems. Examples include a laser-based method to exterminate mosquitoes for malaria control, a travelling-wave reactor that turn nuclear waste into carbon-free energy, and using geoenvironmental technologies to tackle global warming. They look for achievable ideas that can be turned into affordable and accessible technologies. "Vision without action is a daydream," said Holman. "And action without vision is a nightmare." ■

**Tencent**

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