



哈爾濱工業大學
HARBIN INSTITUTE
OF TECHNOLOGY
1920-2020

PILOTING SCIENCE AND ENGINEERING THROUGH INNOVATION

A historic university
from China's northeast
is launching its
tradition of excellence
into the future.

HIT HARBIN



Yu Zhou,
President of HIT,
Member of the Chinese
Academy of Engineering

Founded in 1920, Harbin Institute of Technology (HIT) is an established hub for engineers, and is a leader in aerospace technology. With science and engineering as its core, it has also developed multidisciplinary programmes encompassing liberal arts, management, economics and law. It is a national key university, and a member of China's "Ivy League", the C9 League.

THE MANY FIRSTS OF HIT

HIT was the first in China to establish a school of astronautics; the first university to independently develop a small satellite; and the first to realize the scientific experiment of man-machine coordination on in-orbit maintenance (the *Tiangong-2* space manipulator). It built the world's first micro-satellite (*Longjiang-2*) to complete Earth-to-Moon transfer, near-moon braking, and circumlunar flight, and was the first in China to achieve satellite-ground laser link communications. It was a pioneer in realizing target and multi-beam laser auto-alignment of large laser device, as well as space application of magnetic focusing Hall thruster. It developed China's first computer to play chess and talk to humans, China's first new type long range ocean detection radar system, and its first arc- and spot-welding robot. It was the first to reveal the structure of a ligase complex in the HIV virus.

HIT has produced a large number of achievements that have contributed to major space missions, including the first launches of the Long March 7 and the Long March 5, as well as the *Tiangong-2* space lab and the *Shenzhou-11* manned spacecraft.

EXPANDING REACH AND SCOPE

HIT has signed exchange and cooperation agreements with 278 universities in 39 countries, and, since 2011, has led more than 180 international collaborative research projects. In 2011, HIT initiated and jointly established the Association of Sino-Russian Technical Universities (ASRTU) that now counts 67 elite universities as its members. In 2018, HIT became a member of the University of the Arctic, the largest international academic organization in the Circumpolar North.

HIT's expansion has seen the growth of its campuses in line with regional development. In the coastal city of Weihai in East China, HIT opened a campus in 1985, focusing on developing marine research and ocean economy, as well as intelligent manufacturing and smart cities. It has undertaken

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more than 1,000 projects, including ocean detection technologies, unmanned vehicles, intelligent robots, new information technology, cyber security, new materials, water purification, and renewable energy, generating hundreds of patents.

Seizing the opportunity of the growth of the Guangdong-Hong Kong-Macao Greater Bay Area, HIT's Shenzhen campus is becoming a hub for scientific and technological innovation. Starting from the HIT Shenzhen Graduate School in 2002, it has since established comprehensive degree programmes. Its 10 schools and four research centres focus on research ranging from materials and artificial intelligence, to space science and bio-pharmaceuticals. It is striving to be an international, high-skilled, and research-oriented campus, by revolutionizing higher education and enhancing international collaboration.

With a 'one university, three campuses' model and an expanding international network, "HIT is striving to reach its goal of becoming a world-class university," says Yu Zhou, president of HIT and a member of the Chinese Academy of Engineering. ■

HIT in numbers

- 22 schools, 86 undergraduate major programmes, nine national key disciplines
- Seven state key laboratories
- 38 members of the Chinese Academy of Sciences or the Chinese Academy of Engineering
- 11 disciplines ranked among the global top 1% according to ESI data, with materials science and computer science ranking among the top 1‰, engineering discipline ranking among the global top 1‰, according to ESI data
- In the 2020 ranking of U.S. News & World Report, HIT ranked 1st on the list of the "Best Global Universities for Electrical and Electronic Engineering" and 6th on the list of the "Best Global Universities for Engineering", respectively.

ASTRONAUTICS HIGH ACHIEVING

Established in 1987, the School of Astronautics of Harbin Institute of Technology (HITSA) is the first in China dedicated to cultivating talent and conducting cutting-edge research in the field of aerospace. Renowned for its research on micro-satellites, laser communication, composite materials and control theory, HITSA is a leader driving the advancement of China's aerospace industry.

Consider *Kuaizhou-1*, a novel spacecraft where a satellite and a launch vehicle are integrated. This solid-fuelled carrier rocket is used to launch satellites that monitor natural disaster sites, providing data for relief and rescue. HITSA boasts record-breaking speed in pushing it from launch preparation to in-orbit application.

HITSA is also the developer of *Longjiang-2*, the world's first micro-satellite that independently completed Earth-to-Moon transfer, near-moon braking, and circumlunar flight. Launched in 2018, this low-cost satellite is designed to test the ultra-long wave astronomical observation technology. Equipped with a miniature camera, it has captured stunning images of the Earth and the Moon.

Other pioneering works by HITSA teams include China's first test of satellite laser communication link in orbit, first in-orbit application of an inflatable deployment structure for satellite attitude control, and first biaxial gyro drift test table, a key instrument for testing the precision of inertial navigation platforms and devices. HITSA researchers also conducted the world's first orbital test of an actively-deployed flexible solar array based on shape memory polymer composites, and promoted their application in space.

These achievements are made possible with the synergetic growth of HITSA's four departments, nine centres, and two national key laboratories, as well as contribution by its talented faculty members, including four members of the Chinese Academy of Sciences and six members of the Chinese Academy of Engineering. Its interdisciplinary research extends from astronautics and aeronautics to mechanics, control science and engineering, optical engineering, and electronic science. ■