

A CLEAR LEADER IN METAL, RAIL, AND MEDICINE



In 2000, a merger of three distinguished universities with rich history and strong links to industry, Central South University of Technology, Hunan Medical University, and Changsha Railway College, led to the establishment of a new national key university based in Changsha, the capital of central China's Hunan province.

Central South University (CSU) has developed a strong academic reputation in nonferrous metals, rail transit and medicine. It has the world's most comprehensive academic range in the study of nonferrous metallurgy, covering all the relevant subjects from geology and mining, to materials and control sciences. Its metallurgical engineering and mining engineering programmes are rated second in their relevant categories of the 2018 Academic Ranking of World Universities.

The rail transit cluster, supported by strong civil engineering and transportation programmes, leads in both theoretical and applied research,

particularly on rail aerodynamics, crash testing, and train safety technologies. Its comprehensive research makes it a valuable contributor to China's high-speed railway construction.

CSU's biomedical science cluster, with clinical medicine at the core, has a global reputation for its quality research and health services. Its researchers spearheaded pharmacogenomics research, which aims for effective treatment tailored to a patient's genetic makeup. They have also built large repositories of genetic resources for biomedical research.

AN ENGINE FOR INDUSTRIAL GROWTH

Finding solutions to key technical industrial challenges and serving social and economic needs underpin research activities at CSU. Its innovations are driving relevant industries and regional development. The university set up a system of allocating profit to promote translation of research results. This has incentivized

researchers to establish more than 150 companies, licensing more than 3,000 technologies, including three 100 million-plus RMB deals in 2018 alone. These technologies include the fabrication of wrought magnesium alloys, and the development of novel cathode materials for lithium-ion batteries. Another example is the electrochemical method, developed by CSU researchers, for high-efficiency lithium extraction from salt-lake brines. The technology was licensed to a Shanghai-based company for 105 million RMB.

These research results have also brought CSU more than 90 national science and technology awards, including 14 first-prize awards since 2000. Nine results were selected into the 'top 10 science and technology progresses by Chinese universities'.

CSU's educational model is also characterized by integration with industrial development. The university has enhanced industrial collaboration and practical education. Its training

programmes incorporate general entrepreneurship with specialised knowledge training. Renowned industrial leaders and innovative talents have been nurtured at CSU, including many eminent scientists. Its alumni are well represented among leaders of large private or state-owned enterprises in nonferrous metals, as well as in management teams of China's railway industry.

GOING GLOBAL

Selected for the national 'double first-class' initiative in 2017, CSU is well on the way to becoming a world-class university. Its efforts include establishing long-term cooperation with more than 200 universities and research institutes in 30-plus countries and regions, ranging from the United States, the United Kingdom, Australia, and Japan. It has also built partnerships with multinational enterprises. CSU is striving to gather the world's brightest researchers, and produces talented professionals for industry, driving societal development. ■

A CONVERSATION WITH TIAN HONGQI



PRESIDENT, CENTRAL SOUTH UNIVERSITY (CSU)

WHAT IS UNIQUE ABOUT CSU?

We have taken a unique development route, with outstanding scientific discoveries and technological innovations at the core, and talent cultivation and social services as auxiliary paths. Our research taps directly into the need for innovation and solutions in industry at regional and national levels. Following the university spirit of 'creating knowledge and serving society', we also develop talented people to address these demands. With research strengths in nonferrous metals, rail transit, and biomedicine, we have maintained close ties with industries, seamlessly linking research and applications. This has won acclaim and great recognition from peers, as well as many awards and funding support. It is what drives our growth.

HOW DO YOU DESCRIBE CSU'S DEVELOPMENT MODEL?

Our development model, divided into five big goals, emphasizes meeting important needs, building big platforms and big teams, undertaking big projects, and making big contributions. The development of 'big science' often needs international collaboration, requiring advanced research platforms with state-of-the-art infrastructure. Good platforms help attract talented researchers and we are keen to cultivate capable team leaders to organize large teams on major projects to make important breakthroughs. By translating research results into technologies that serve societal needs, we can contribute to national economic growth

and societal development. We also contribute to society by cultivating talented, innovative, and responsible citizens.

HOW ARE RESEARCH AND EDUCATION INTEGRATED AT CSU?

Research and education are our main driving forces, and they promote each other. Talent training requires good teachers with rich research backgrounds. They can provide students with hands-on training in necessary research skills, and by directly involving them in projects. This enhances their capacity for innovation. In turn, talent training also supports research. Our students have played important roles in generating research results and patentable inventions. One of our undergraduates solved the Seetapun Enigma, a classical mathematical logic puzzle proposed by English logician David Seetapun, gaining recognition throughout the global research community in the field. The integration of research and education is implemented in our natural science, as well as engineering programmes. We are reforming our management systems, researcher evaluation and reward mechanisms to enhance this integration, promoting the quality of student training.

WHAT ARE THE SOCIETAL IMPACTS OF CSU RESEARCH?

We have three major academic clusters, whose developments are all deeply rooted in industry. In nonferrous metals, our technologies are applied in the mining, steel, manufacturing, and

energy industries, helping to save costs, increase efficiency, and reduce environmental damage, bringing in substantial economic benefits. Our research also supports strategic development of the rail industry. We set the standards for high-speed train testing and are behind the construction of most of the major train lines, providing technical support in railway bridge design, railway sub-ground material development, to crash testing, ensuring the safety of high-speed networks. In biomedicine, we lead in clinical research on metabolic diseases, psychiatric disorders and geriatric diseases, and our affiliated hospitals provide medical services to people in the region and beyond, playing important roles in disaster relief and international assistance activities.

WHAT DO YOU WANT TO ACHIEVE DURING YOUR TENURE AT CSU?

Becoming a world-renowned university with unique characteristics is our goal. We expect to be ranked among the world's prestigious universities by the middle of the century. To achieve this, I hope to be able to promote our academic impact, and to attract the world's brightest students and most talented researchers to CSU. By boosting our capacities for basic and applied research, we are striving to become a major base that leads research innovation and talent training in nonferrous metals, rail transit and biomedicine. We also want to be a hub for cultural preservation and innovation. ■