

SPOTLIGHT ON CHENGDU

A difference near and far: local knowledge has broad impact

Research in Chengdu is concentrated on regional geographical issues as well as contributing to global scientific questions.

“Research is extremely important in our evaluation system, and we strive to allow research, education and clinical practices to work together.”

Li Guangxian, Sichuan University

AS CHINA’S fourth largest city, the provincial capital of Sichuan Province, Chengdu is at the centre of southwestern economy and technology. The city’s significance increased when the Vietnam War began escalating in 1964, and the Chinese government responded by investing heavily in regions far from the coast. Many industries, colleges and research institutes were established, and others moved to the city during the following years, combining traditional culture and leisurely lifestyles to make Chengdu a competitor in the R&D industry.

Local development

Many newly developed institutes are designed with two goals in mind: undertaking research and contributing to local community development. The Institute of Mountain Hazards and

Environment (IMHE), Chinese Academy of Science (CAS), for example, focuses on environmental sciences and natural disasters in mountainous regions. “But much of our work can be directly applied to sustainable development,” says Zhang Jinshan, head of human resources at the institute. Debris flow mitigation and dam region erosion are two fields in which this institute excels, IMHE also contributes an expert natural disaster relief team whenever natural disasters strike, as they are prone to do in the region. In these circumstances, teams of scientists and disaster experts are poised for response: searching and organizing background data, communicating with CAS and the local government, planning the route, preparing the supplies. “All this happens simultaneously, and we can hit the road the moment we get permission,” adds Zhang Jinshan.

Researchers in Chengdu also contribute to local industries. The University of Electronic Science and Technology of China (UESTC), for example, designed the semiconductor control panels for the Chinese bullet trains, according to Professor Zhang Huaiwu, head of the School of Microelectronics and Solid-State Electronics.

Zhang Huaiwu’s team is also growing the largest, lead-free microwave source crystals with minimal defects. They hope to combine them with integrated circuits to create a 2D sensor-array that can detect multiple signals: light, electricity and heat. “This could mean a lot for the Internet of Things,” adds Zhang Huaiwu. “More advanced sensors would allow us to track ‘things’ in their actual environment, rather than simple numbers about distance and direction.”

The Tianfu Life Science Park is home to 170 enterprises (mostly bio-medical), 85% of which are R&D focused. It is supported by the government, which, through the Thousand Talent Plan, offers at least a million yuan start-up investment and up to 5 million yuan discounted loans for companies looking to set up base there. Chengdu city also has its own start-up fund of up to 2 million yuan to support start-up businesses. They let “researchers do what they do best,” says Kong Xiankai, Tianfu’s director. “As long as you’ve got a detailed business plan, we’ll help you get all the support you need: human resources, initial investment, rent discounts, amongst other things.” (See **Supporting science.**)

Multidisciplinary approaches

Basic research is also flourishing in the region. Professor Wang Zhiming, at the Institute of Fundamental and Frontier Sciences (IFFS) at UESTC, says they are making rapid developments in small-scale information science, quantum physics and control. But what he really takes pride in is the freedom of the institute. “Most universities in China will require their professors to teach a certain number of courses, get certain amount of grants, publish certain number of papers,” says Wang Zhiming, “but here in our institute all we need is an annual report.” Information science, the institute’s speciality, is multidisciplinary and Wang Zhiming hopes that each researcher will take a different career direction, “making connections along the way, giving birth to new research areas”.

Sichuan University is known for its collaboration with industry, especially as a core player in the development of the



Researchers assess a landslide as part of investigations into earthquake risk and impact in Wenchuan, Sichuan.

Tianfu New Area, (a large urban development project that was approved in 2014). Yet in the last 20 years, it absorbed two other state key universities: Chengdu University of Technology and West China university of Medical Sciences. "It was a very successful merger," said Li Guangxian, vice president of the university, "and it provides a huge boost for our interdisciplinary research."

Sichuan University has been investing in and promoting interdisciplinary research projects for almost 20 years, according to Li Guangxian, and each year the university provides more than 30 million yuan in financial support for these regional projects. One example is the National Center of Translational Medicine Project on the university campus, the total budget of which is a billion yuan. Other notable fields receiving support include new energy technologies and biomedical applied materials.

Before merging with Sichuan University, West China University of Medical Sciences was already one of the best medical universities in China. "West China College of Stomatology (WCCS) is first rate globally, and might be the best in Asia," says Li Guangxian. "Our clinical researchers have a unique advantage: access to patients." There are four hospitals under the name

of West China, treating 3-4 million patients each year. WCCS alone sees more than a thousand patients per day, presenting the doctors, clinicians and researchers with a wide variety of cases.

Home to the only national key laboratory of oral medicines in China, WCCS has a team of doctors and researchers focused on basic and clinical research. "Research is extremely important in our evaluation system, and we strive to allow research, education and clinical practices to work together," says Li Guangxian. Sichuan University has been promoting its "International Leading Scholar Program" for seven years, introducing more than 300 foreign scholars, and more than 30 in WCCS alone.

A Balanced life

Even with all this investment in cutting edge R&D, the people of the city have a balanced lifestyle. The city is surprisingly slow-paced featuring many teahouses everywhere, Sichuan cuisine is the most popular style in China, and UNESCO has granted the Chengdu the status of City of Gastronomy. Strolling through one of its numerous parks, you might easily mistake it for a tourist town. Kong Xiankai says the easy lifestyle "helps the researchers calm their mind and be less rash in



Strong investment in research and local industries means Chengdu is a thriving place to work.

their work." Zhang Jinshan from the IMHE agrees with him: "our scientists can relax better when they need to; there is no negative impact on their research."

"Chengdu is the most 'Chinese' metropolis, while cities like Beijing and Shanghai don't feel that different from cities like New York," said Wang Zhiming from UESTC, who has worked both in Beijing and in US. "Foreigners usually like to know about the real China and see something new."

Chengdu has the fourth most international flight traffic in China, after Beijing, Shanghai

and Guangzhou; its economic growth rate was 1.5 and 0.4 percentage points higher than the national and provincial averages respectively; it has some of the best research institutes in China; and the government is dedicated to supporting R&D in the area. "I don't think Chengdu is less 'open' than Beijing or Shanghai in any way," says Li Guangxian.

This content was commissioned and edited by the Naturejobs editor



Dr Li Jin, CEO, HitGen Ltd.

Supporting science

Sixty per cent of the enterprises in Tianfu Life Science Park are established by Haigui; a colloquial term for people who have returned from studying abroad. Many Chinese people are educated abroad, and stay to gain work experience before returning to China. Some experienced considerable cultural shock in large cities like Beijing and Shanghai, but most of them easily adapted to life in Chengdu, says Kong Xiankai, Tianfu director.

Before coming to Chengdu, Dr Li Jin, CEO of HitGen Ltd, spent many years studying and working in the UK and Sweden. "Chengdu is a good place for Haigui," he says. "It is much easier for a start-up to get funds in China than Europe." And with the former West China University of Medical Sciences so close, "we can reach the doctors and patients much easier. That's what drugs are for, after all."

Since its launch in 2012, HitGen Ltd has successfully built more than 700 chemical libraries for early drug discovery, and is providing profitable services to organizations like Tasly Pharmaceutical and the Institute of Cancer Research, London.

They also have a research programme of their own, working on potential drugs for conditions including, cardiovascular diseases and inflammation.

"We received substantial support from the Tianfu Life Science Park," says Li Jin. "They organize an excellent biomedical saloons, where people from companies, government and universities share information about running a biomedical business."

For incoming academic researchers, there is a network of support systems in place. "Salaries, grants, housing expenditures, getting a team together, even the education for your children; we'll offer all the help you need and our terms are certainly competitive," says a spokesperson from the human resource department at Southwest Jiaotong University. As a university with a 119-year history, it has established itself as the leader of traffic and transportation engineering in China, attracting 39 international researchers in 2014. Other support comes directly from the provincial government: for example, the 'Sichuan Thousand Youth Talents Plan', once granted, would mean up to a million yuan for each researcher.



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Sichuan University, a Prestigious University in China

Founded in 1896, Sichuan University (SCU) is one of the oldest universities in China and among the most prestigious national key universities in terms of education, research and social impact.

Located in downtown Chengdu, a famous historic and cultural city dubbed 'the land of abundance', SCU has three campuses and covers an area of 470 hectares with a floor area of 308 hectares. With its favourable environment and beautiful scenery, the university is a conducive place for learning and doing research.

SCU formed through a series of mergers involving three national universities: the former SCU, the former Chengdu University of Science and Technology and the former West China University of Medical Sciences.

Having a long tradition in education, SCU boasts many renowned scholars. Over the past century, it has attracted masters such as historian Gu Jiegang, philosopher Feng Youlan, writer Li Jieren, esthetician Zhu Guangqian and physicist Wu Dayou. It also has many famous graduates, including Zhu De, one of the

founding fathers of the People's Republic of China, Yang Shangkun, former Chairman of China, Guo Moruo and Ba Jin. SCU alumni include over 50 members of the Chinese Academy of Sciences and the Chinese Academy of Engineering.

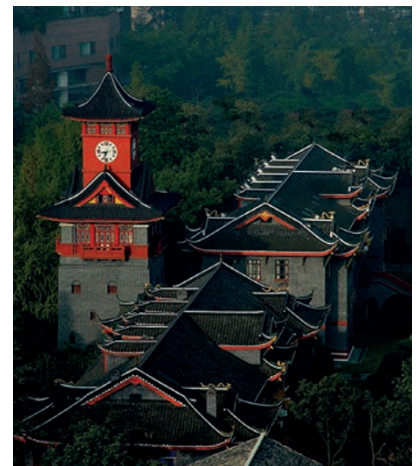
Current status of SCU

SCU has 32 colleges and professional graduate schools covering 12 disciplines. It has over 4,000 faculty members who graduated from world-renowned research universities and give diverse and in-depth courses to 40,000 undergraduate students, 20,000 graduate students and over 2,000 international students who are pursuing undergraduate, graduate and language study.

The university offers 349 doctoral programmes, 443 master programmes, 133 undergraduate programmes, and 37 postdoctoral positions. It also has 46 national key disciplines and 4 national key cultivated disciplines. There are 4 hospitals affiliated with the university, all directly supervised by the Ministry of Health.

SCU is particularly strong in science and research and has made remarkable

advances over the years. It has 13 national key laboratories and engineering centres, 17 key laboratories and centres funded by the Ministry of Education, 45 provincial key laboratories, 3 key laboratories supported by the Ministry of Health, 4 key research bases for humanities and social sciences, and 3 clinical research bases at the national level. SCU has completed a considerable number of national, ministerial and regional major research projects. Some of its achievements are rated first class



in China having significant international influence.

20 subjects at SCU are among the top 10 in China; 5 subjects — chemistry, clinical medicine, engineering, materials science, pharmacology and toxicology — are among the top 0.5 per cent in Thomson Reuters' Essential Science Indicators, while chemistry is among the top 0.1 per cent.

Among research universities in China, SCU ranks 5th in terms of SCI publications, 6th in MEDLINE publications and 18th in Engineering Index publications.

SCU actively promotes both regional and national development of the economy and society, and its capacity to contribute to society is becoming stronger. The university is one of the 6 national technology-transfer centres and one of China's 10 pilot universities for protecting intellectual property rights. The Science and Technology Park of SCU is one of the first 15 national college science and technology trial parks approved by the state, and it has incubated over 50 science and technology enterprises, including one listed company.

With over 100 established world-class academic partners globally, SCU highly values international cooperation. It boasts 9 international research platforms and 4 partners of the Confucius Institute. The university is dedicated to providing an international education experience for all students, and supporting faculties and institutes to create international research platforms in science and technology and the liberal arts.

In 2012, SCU initiated a two-week University immersion programme in which lecturers from all over the world gave lectures to domestic and international students at undergraduate and graduate levels. In 2014 alone, 141 international lecturers participated in the programme to deliver 183 English-language courses in various areas to over 15,000 SCU students and 400 international students.

Talent recruitment

SCU has long emphasized the recruitment of talented researchers. In 2011, SCU launched a new initiative to attract



talented overseas scholars of different levels from around the world, including a part-time high-level foreign teacher programme, a full-time foreign teacher programme, a programme for young scholars from renowned universities, an excellent scholar programme, and a programme for hundred young talented researchers in the liberal arts and social sciences. Nearly 400 talented researchers from world-renowned universities, including Oxford University, Cambridge University, Harvard University and Tokyo University, have joined SCU through these programmes and are playing an increasingly important role in teaching and research.

Experts and scholars in China and abroad are encouraged to apply for faculty positions at SCU. The following disciplines are accepting job applications: economics; law; literature and journalism; history and culture; physics; manufacturing science and engineering; life science; foreign languages; electrical engineering and

information technology; arts; chemistry; electronics and information technology; business; political science; materials science and engineering; medicine; stomatology; chemical engineering; pharmacy; public administration; physical education; public health; software engineering; hydraulic and hydroelectric engineering; mathematics; computer science; light industry and textile and food engineering; preclinical medicine and forensic medicine; polymer science and engineering; architecture and environment; and post-disaster reconstruction.

Applicants should submit a detailed curriculum vitae together with a list of publications to the Talent Recruitment Office of the Human Resources Department at SCU (recruitment@scu.edu.cn).

We invite talented researchers from around the world to join us. You will find SCU an attractive place to live and a stimulating place to work with a supporting community.

Contact

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The West China School of Stomatology

The West China School of Stomatology is renowned as the birthplace of modern dental science education in China. Founded as a clinic in 1907, by 1912 it had developed into the first dental hospital in China to serve the dental needs of its local community. In 1917, the hospital became the Department of Dentistry of the West China Union University, and soon evolved into the School of Dentistry. The School of Stomatology was officially founded in 1928. The school's title has since changed several times, finally becoming the West China School of Stomatology in 2001, after merging with Sichuan University.

For the past 100 years, the West China School of Stomatology has been 'the Chinese Mecca' for higher education in dental science. With a reputation for excellence, dedication, skill and competitiveness, the school nurtures not only the nation's top educators and leading

scholars in the dental sciences, but also the leadership at many of the nation's other schools of stomatology.

Faculty and education

The West China School of Stomatology adopts an integrative approach to teaching, clinical care and research. The school has 844 faculty and staff members, of which 182 are senior faculty members, 48 are mentors of doctoral students and 68 are mentors of master students. The school has five academic departments that have 24 research subunits covering fields such as the preclinical medicine of stomatology, oral medicine, oral and maxillofacial surgery, prosthodontics and orthodontics. Accredited doctoral degree programmes are offered in the clinical and basic science of stomatology; these courses have been designated National Quality Courses. The school offers five-year bachelor degree programmes, master degree

programmes, eight-year doctoral degree programmes and a Ph.D. programme. The school has been ranked first among the dental schools of mainland China for 15 consecutive years.

Many awards and titles have been conferred on its faculty members by various national and provincial institutions in recognition of their achievements. These include two nationally recognized teachers, two Yangtze River Scholars of the Ministry of Education, two recipients of China National Funds for Distinguished Young Scientists, one Chief Scientist of the National '973 Program', five 'Thousand Talent Program' professors, three 'Thousand Talent Program' young investigators and four winners of the National 100 Distinguished Ph.D. Thesis Young Scholars. Furthermore, two professors are members of the Discipline Review Group of the State Department, two have been recognized as National Talents by the Ministry



of Human Resource Administration, sixteen as New Millennium Talents by the National Ministry of Education, and one as an Eminent Professor by the National Ministry of Science and Technology.

Research

The history of the State Key Laboratory of Oral Diseases (SKLOD) of Sichuan University extends back to 1936, when the first research department of stomatology in China was established at West China Union University. The laboratory was designated the first Key Laboratory for Stomatology by the Ministry of Public Health in 1989 and as a Key Laboratory by the Ministry of Education in 2002. In 2007, the laboratory became the first State Key Laboratory in oral science in China, and it was named the State Key Laboratory of Oral Diseases by the Ministry of Science and Technology of China. Currently, the SKLOD occupies an area of 7,000 square metres and owns state-of-the-art equipment and facilities worth more than 80 million RMB. The SKLOD is recognized nationwide as an important academic research and training centre for researchers and postgraduate students.

The laboratory investigates the mechanisms of and treatments for oral diseases. The long-term objective of SKLOD is to establish the best international laboratories for oral diseases by drawing on excellent investigators, researchers, resources and techniques. Cutting-edge research activities at SKLOD can be classified in four main categories: the prevention and treatment of oral infectious diseases, development of new dental materials and biomaterials, etiology and treatment of oral maxillofacial anomalies, and metastasis prevention and treatment of oral cancer.

Each year, SKLOD conducts a large number of key projects granted by both the state and province, including grants from the '973' and '863' Key Projects, State Programs for Tracing Key Problems in Science and Technology, Chinese Natural Science Foundation and other key programmes from the Ministry of Education, Ministry of Health and Sichuan Province.

In 2012, the school was recognized as an International Joint Research Center by the Ministry of Science and Technology of



China. In 2013, the Ministry of Education approved the construction of the Oral Translational Engineering Research Center, a high-level research platform for basic research and applications.

In 2008, the school started editing and publishing *The International Journal of Oral Science*, which has been listed in the Science Citation Index Expanded (SCIE) and PubMed (MEDLINE) and is China's first English-language journal on dental science. *Bone Research*, another English-language periodical was founded in 2013, which has been listed in both SCIE and PubMed (MEDLINE) from its first issue. *Bone Research* focuses on the basic and clinical aspects of bone biology, pathophysiology and regeneration. It publishes key discoveries obtained by basic investigations and clinical research into bone and serves as a bridge between dentistry and medicine. Both journals are well recognized and cited by academics from around the world. They are ranked in the first quartile of science journals in the fields of dentistry and bone biology.

The school is ranked top among national stomatologic institutions in terms of academic achievements and its papers are highly cited in SCIE journals. The hospital

is ranked top in the 2014 Scientific and Technological Influence List of Chinese Hospitals for the category of stomatology.

Clinic care

The West China Hospital of Stomatology has long been ranked as one of the nation's top hospitals. It serves as a clinical treatment centre for oral diseases and maxillofacial surgery in western China because it can provide a full range of sophisticated diagnostic and therapeutic treatments. The hospital occupies 54,540 square metres in a newly built clinical building, which has 325 dental units and 204 inpatient beds. The hospital annually treats about 750,000 outpatients (including emergency cases) and admits 5,400 inpatients, among whom about 4,300 receive operations. When a magnitude-8 earthquake occurred in Sichuan in 2008, the hospital provided timely first aid and rescue services to those wounded in the disaster, receiving national and provincial praise for their efforts. Finally, the hospital is registered as a State Dental Residency Training Center, a Center for Dental License Exam and a State Institute for Drug Clinical Trials.

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Institute of New Energy and Low-Carbon Technology, Sichuan University

Energy fuels human civilization, but the significant environmental and climate change challenges brought about by developments in energy technology have attracted worldwide attention, leading to numerous calls to action.

The Institute of New Energy and Low-Carbon Technology (INELT) was established to respond to this international call and to help build a resource-saving, environmentally friendly society. Drawing on Sichuan University's multidisciplinary resources, INELT has developed into a research platform that integrates environmental science and engineering, chemical engineering, chemistry, materials science and engineering, life sciences, hydrology and hydropower engineering, civil engineering, economics and management sciences to provide innovative research solutions to some of the most pressing concerns of the new millennium.

INELT focuses on exploiting unconventional underground energy sources (for example, shale gas), solar power, biomass, and new energy-storage materials and devices. It also conducts ground-breaking research into low-carbon urban development, low-carbon economy, policy and management, utilization and storage of carbon dioxide, energy conservation and emission reduction, and catalytic combustion.

As a domestic and international energy research leader, INELT has also established partnerships with Sinopec, PetroChina, Shenhua Group and Guizhou Wengfu to promote the industrialization of basic engineering research.

INELT aims to develop into an internationally influential, solid low-carbon economics and technology research base. Its overall mission is to realize an ecologically sustainable civilization and to promote the coordinated development of humans, society and nature. Elite researchers with overseas study or work experience at renowned universities or research institutes are sincerely welcome to apply to work at INELT.

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Recruitment of high-level teachers and researchers

Colleges of Computer Science and Software Engineering, Sichuan University

The College of Computer Science (<http://cs.scu.edu.cn>) and the College of Software Engineering of Sichuan University (<http://www.scu.edu.cn/sw/>) are seeking to expand and build strong teams of teachers and researchers. Accordingly, they are now recruiting high-level teachers and researchers from China and abroad for the following positions: professors, distinguished researchers, distinguished associate researchers and full-time foreign (non-Chinese citizens) teachers.

Requirements

Candidates should:

1. Possess a doctorate degree from a well-known university (in China or overseas) in computer science and technology or software engineering. In addition, they should have experience studying or working overseas in the field for at least a year.
2. Have a strong academic knowledge of computing or software engineering and excellent potential for development. Candidates should also be able to clearly demonstrate their achievements in the field.
3. Have strong personal and professional ethics. Candidates should be well-behaved, passionate, strongly committed to work, and possess a strong sense of responsibility. They should be able to work well in a team and coordinate with others, as well as having good organizational skills and an innovative spirit.

Recruitment procedure

1. Create an account on the personnel information management system of Sichuan University (<http://rsxxgl.scu.edu.cn/Common/Recruitment.aspx>) and submit an application. Please provide accurate personal information during registration.
2. Follow the relevant recruitment procedures of the school.

Please note that applicants are required to abide by the relevant recruitment policies and rules of Sichuan University.

Contact:

Mrs. Liu (tel: 86-28-85469688; e-mail: 1293634119@qq.com)



The School of Manufacturing Science and Engineering, Sichuan University

Sichuan University's School of Manufacturing Science and Engineering is one of the university's largest research and teaching schools with a long, rich history. Originally part of National Sichuan University's School of Mechanical and Electronic Engineering, the School of Manufacturing Science and Engineering was established as a separate entity in March 1945.

Today, the school is an important base in western China for research and teaching related to the manufacturing industry. The school consists of four departments — Mechanical Engineering, Material Forming and Control Engineering, Test Technology and Control Engineering, and Industrial Design — and two national-level Experiment Teaching Centers. In addition to a strong research and teaching faculty, approximately 2,000 undergraduates, 1,000 postgraduates and 100 PhD students are currently studying or conducting research in the school.

An invitation to join us

Applications are invited for full or associate professor positions in the areas of Mechanical Engineering, Materials Science and Engineering, Instrument Science and Technology, Aerospace Science and Technology, and Biomedical Engineering. Successful candidates will be offered a competitive salary and provided with support to set up their own academic research programmes.

For more details, please visit: <http://msec.scu.edu.cn/>
 Please direct any inquiries regarding the application to Mrs Qiu Yang:
 Telephone: +86-028-85403687
 E-mail: yangqiu1975@scu.edu.cn



Recruitment announcement for the College of Chemistry, Sichuan University

The College of Chemistry at Sichuan University has a long history of more than 100 years. Over a century of discovery and experience has nurtured an excellent academic atmosphere and a great educational tradition. The College boasts several national and provincial research institutes and has a distinguished faculty, which includes two academicians and many globally renowned scholars. We are currently seeking outstanding candidates for the positions described below.

Full-time faculty positions at professor or associate professor level

We are actively seeking excellent faculty candidates from China and overseas. We offer competitive salaries and conditions, which include generous funds for scientific research, ample laboratory space and a professorship (or associate professorship depending on the research achievements of the applicant). Salary and conditions will be negotiated.

Requirements for international faculty

- Doctorate in a chemistry-related field
- Experience teaching at a university level
- Competency in teaching and conducting scientific research
- Under 60 years old
- Native English speaker

Successful candidates will be expected to teach undergraduate courses in inorganic, physical and analytical chemistry.

Requirements for Chinese faculty

- Doctorate in a chemistry-related field
- Globally influential scientific achievements
- Competency in conducting national key research programmes
- Under 45 years old

Application guide: Please send us your latest curriculum vitae, scanned copies of your degree certificates, a statement of your academic achievements (1,000 words) and a plan for research and teaching.

Contact information

Website: <http://chem.scu.edu.cn> E-mail: suxiaoyu@scu.edu.cn
Contact: Ms. Su Xiaoyu Tel: 028-85412291



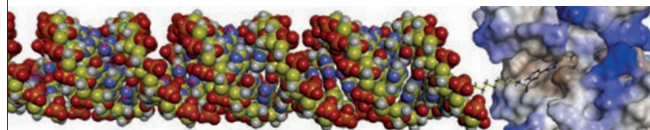
Harnessing the Power of Encoded Library Technology for your Targets

HitGen Ltd is a biotechnology company based in the Tianfu Life Science Park of the Chengdu High-Tech Industrial Development Zone. Our primary focus is on generating high-quality drug leads through hit identification and optimization in collaboration with our partners. To this end, HitGen has established a core platform consisting of high-quality, large DNA encoded compound libraries and research capabilities in protein expression and purification, *in vitro* screening and affinity selection, chemical library design and synthesis, and medicinal chemistry.



OpenDEL: Making Large Encoded Library Screening a Viable Alternative to HTS

HitGen's new OpenDEL encoded library of over 145 million small molecules with drug-like properties can be screened by using only 2 milligrams of the target protein at costs comparable with HTS on much smaller decks. The library is based on 70 different templates and designed for high diversity within drug-like space.



HitGen's commitment to innovation

OpenDEL is just one of the innovative encoded library collections available for screening at HitGen. Our constantly growing libraries now contain over 1.4 billion molecules, and include our Macrocycle Lead-Finder library of more than 50 million diverse macrocycles. These libraries have been shown to generate exciting hits for several challenging targets including PPIs.

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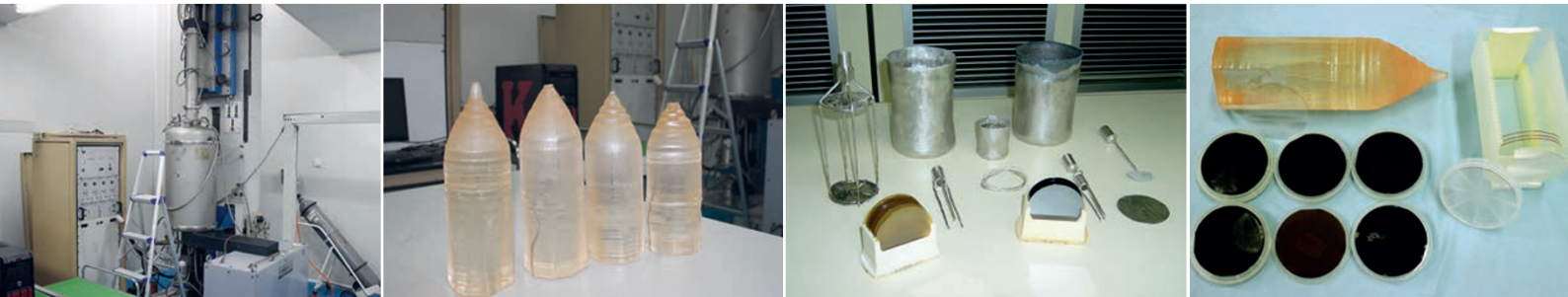
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Single-crystal garnet materials for communication

An international team of researchers at the School of Microelectronics and Solid State Electronics, University of Electronic Science and Technology of China (UESTC), is using cutting-edge technology to explore the mechanisms of crystal growth for high-performance microwave and optical communications applications. More specifically, the team is studying microwave-band, large gallium gadolinium garnet (GGG) single crystals and Mg:GGG single crystals and is developing production lines for large monocrystalline materials in China. The team, led by Huaiwu Zhang and representing institutes in Europe, Russia, Ukraine, the United States and China, hopes to resolve critical issues in the development of optical communication systems, including low defect density, low ferromagnetic loss and anti-electromagnetic interference of growing large single crystals on a GGG substrate using liquid-phase epitaxy.

Using liquid-phase epitaxy, the team has produced GGG monocrystals with diameters between 82 and 105 millimetres and lengths between 250 and 320 millimetres. The scientists have independently produced a batch of 4-inch GGG monocrystals that meet their client's technical specifications.

Zhang's team have also proposed an alternative nontoxic material for growing crystals at high temperatures that involves using the flux method in liquid phase epitaxy. The current state-of-the-art fluxing technique requires the use of lead,

which causes problems such as high defect densities in thin films, heavy pollution and high lattice mismatch ratios. The researchers therefore substituted lead oxide with boron oxide and bismuth oxide in the fluxing process, and successfully grew a three-inch-diameter magneto-optical single-crystal garnet film. These three-inch-diameter wafers have a superior Faraday rotation response (2.2 versus less than 0.8 degrees per micrometre) and a lower intrinsic defect density (10 versus 40 defects per unit volume) due to their near-perfect lattice match with the pure GGG substrate. The team has since manufactured a series of related monocrystalline thin films for many research institutions and enterprises in the US, the UK, Japan, Korea and China for application in spintronic devices, integrated microwave devices and optical communication devices.

The research team has also developed large-scale wafer processing techniques that will enable advances in next-generation integrated communication systems. They have been able to produce 70-micrometre-thick lanthanum-doped yttrium iron garnet (La:YIG) films on three-inch-diameter wafers of GGG with among the best recorded ferromagnetic resonance line widths for a YIG-based film. Such low line widths directly translate into superior microwave device performance metrics such as insertion loss, paving the way for advances in next-generation wireless communication. The YIG foundry at the UESTC represents a one-of-a-kind facility.

Based on these large YIG single-crystalline thick films and other magneto-optic single-crystalline thick-film materials, Zhang and his team have designed and produced various devices, including an array-integrated Faraday magneto-optic switch, a magneto-optic isolator and circulator, a microwave filter and an integrated delay line. Their achievements will provide solid support for microwave systems as the technology transitions from a body system to an integrated planar system, and signify a step up in terms of the reliability, stability, accuracy and sensitivity of integrated optical communication devices.

Main cooperating regions: Europe, Russia, Ukraine, USA

Sponsor: University of Electronic Science and Technology of China

Supervisor: Professor Huaiwu Zhang



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Innovative thinking and a global outlook: A school for life

The University of Electronic Science and Technology of China (UESTC) is located in Chengdu, the economic, cultural and transportation centre of West China. Chengdu is known as 'the land of abundance' and the 'hometown of the giant panda'. UESTC established the Institute of Fundamental and Frontier Sciences (IFFS) in 2014 specifically to attract experts in the areas of fundamental research, implement its vision for a high-level, research-focused university, strengthen its innovative capability, and enhance its academic impact. IFFS pursues intelligence, focus, freedom and success with a constant goal of advancing the promise of quantum physics at the nanoscale for processing and communicating electronic and photonic information to realize new knowledge and positively impact society.

Why did you choose IFFS at UESTC?



"Launching the IFFS was a great accomplishment for the university and certainly a reflection of having the right people in the right place at the right time. It has been

an honour to lead this initiative. Guided by the university's three core strategies, we expect to attract more talented researchers from around the world to become full-time and adjunct professors here and to advance both multidisciplinary and interdisciplinary collaborative research. Having the IFFS in Chengdu certainly adds another dimension to life — it's more than a job!"

Prof. Zhiming Wang (Global Expert of the 1000 Talent Program) — Materials physics



"I chose IFFS-UESTC because it (together with the Chinese government) offered me a generous start-up and support that I could never find at a

US university as a young scientist. The newly formed IFFS is young and vibrant and full of opportunity. I enjoy pursuing my research with great freedom and in an atmosphere of international collaboration. Moreover, Bib Gourmand-like restaurants are everywhere in Chengdu."

Prof. Yijing Kang (1000 Global Talent Youth Expert) — Alternative energy



"I chose to be part of IFFS at UESTC because of the Institute's vision and its focus on fundamental science. I enjoy my visits to IFFS in the beautiful city of Chengdu,

not just because of its nature and pandas, but also because of the opportunity to interact with bright young people who have high aspirations and are willing to work hard to achieve their dreams and goals. The leadership of UESTC has shown its vision and ambition in creating IFFS and I congratulate them."

Prof. Chennupati Jagadish (Short-term Foreign 1000 Talents Program Expert, IFFS-UESTC & the Australian National University)

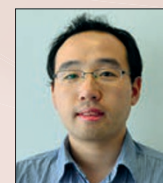


"I was honoured to join IFFS because of the collaborative nature of this effort and the emphasis on basic research. IFFS is located in a uniquely

beautiful region of China and the Changjiang Chair Professorship is an opportunity to create a virtual bridge between Chengdu

and Montreal, to jointly train young scientists on projects of common interest. Last, but not least, I am linked to the IFFS members through both professional and personal ties, which makes the environment more friendly and the experience more rewarding."

Prof. Federico Rosei (Yangtze River Scholar, IFFS-UESTC & INRS)



"The UESTC has enjoyed a good reputation for innovation since it was founded in 1956. And the IFFS is a brand-new comprehensive re-

search institute focusing on fundamental and frontier research. It offers researchers a very free and cooperative research atmosphere. I enjoy pursuing a research career here very much. Besides that, Chengdu is a strategic location in China and the government is firmly committed to investing in research at Chengdu. This city is becoming an emerging hub for international research and is attracting world-class researchers."

Prof. Xu Deng (1000 Global Talent Youth Expert) — Surface science

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基础与前沿研究院
Institute of Fundamental and Frontier Sciences



ADVERTISEMENT FEATURE

Southwest Jiaotong University: Call for Academic Applications

Southwest Jiaotong University (SWJTU) was founded in 1896 and is located in Chengdu, the capital of Sichuan province in China's dynamically growing west. SWJTU is a leading university with key national multidisciplinary projects directly managed by the Chinese Ministry of Education. In addition, it has comprehensive education and research programmes run by 19 faculties, institutes and centres. SWJTU excels in engineering as well as in the sciences and arts. It has undergraduate and graduate divisions with more than 2,600 academic staff and offers 11 postdoctoral programmes, 15 doctoral programmes, 43 master courses and 75 undergraduate courses. Furthermore, it has over 30 key national- and provincial-level laboratories.

As part of its campaign to develop and strengthen the university by introducing and cultivating talented teachers and researchers, SWJTU is currently recruiting for academic positions in the following disciplines: civil engineering; surveying science and engineering; mechanical engineering; the science of transportation and logistics; information and communication science; electrical engineering; computer science and technology; materials science and technology; mechanics; management science and technology; managing technology and innovation; environmental science; architecture; physical science; mathematical science; life science; medical science; chemical science; and humanities and social science.

Positions and requirements

A. High-level talented leaders

Candidates, preferably under 50 years old, should be qualified to be listed in national top talents programmes such as the Program of Global Experts, the Top Young Talents of National Special Support Program, the Chang Jiang Scholars Program, the China National Funds for Distinguished Young Scientists, and the National Award for Distinguished Teachers.

B. Young leading scholars

Candidates should preferably be listed in or have qualified for the National Thousand Young Talents Program, the Top Young Talents of National Special Support Program (Program for Supporting Top Young Talents) or the Science Foundation for Excellent Young Scholars.

Eligible candidates should have good team spirit, leadership ability, outstanding academic achievements, a broad academic vision, experience with international collaboration and the potential to become leading academic researchers.

C. Excellent young academics

Candidates for professor or associate professor, preferably under 40 years old, are expected to have graduated from a first-class university or institute in China or overseas.

D. Excellent doctoral and postdoctoral fellows

Candidates, preferably under 35 years old, must have the potential to become excellent academic researchers at first-class universities in China or internationally.

Salary and fringe benefits

Salaries will be highly competitive and commensurate with qualifications and experience. SWJTU offers a comprehensive fringe-benefit package for eligible appointees, including settling-in allowances, subsidized rental accommodation, start-up funds for scientific research, assistance in establishing a scientific platform and research group, and international-level training and promotion.

SWJTU will also help eligible appointees find suitable education for their children. Special assistance for outstanding returnees can be discussed personally.

Application procedure

Please send a full resume, copies of academic credentials, a publication list with abstracts of selected published papers, a together with the names of three referees to the SWJTU Human Resources Department.



Contact

Web: <http://www.swjtu.edu.cn/>

Phone: +86-28-66366202

E-mail: talent@swjtu.edu.cn

Address: Human Resources Department, SWJTU, Western Park of High-Tech Zone, Chengdu, Sichuan, China, 611756



ADVERTISEMENT FEATURE

Concern for the future of mountains

The Institute of Mountain Hazards and Environment (IMHE), Chinese Academy of Sciences (CAS), is a national academic institute that focuses on research into mountain hazards, ecology and environment, with the ultimate goal of supporting the sustainable development of mountainous regions. In April 2015, IMHE was designated an Institute for Special Needs under CAS's Pioneer Initiative. It continues to be China's leading think tank for research on mountain surface systems and strives to become a globally recognized organization for mountain science.

Since its establishment in 1965, IMHE has made great contributions to hazard mitigation, environmental protection and sustainable development in the mountains of China, accomplishing over 1,000 research projects and receiving over 150 awards.

The institute will continue to serve its mission of conducting integrated research on mountain science and supporting regional needs for mountain development and innovation. To achieve these goals, IMHE will continue to lead research in the areas of debris flow, mountain ecology and strategic mountain development. It will also develop theories and technologies related to the mitigation of major mountain hazards, the protection of mountain ecology, the construction of ecological barriers, the conservation of water and soil, and the control of non-point-source pollution.

Over the past 50 years, IMHE has set up a comprehensive programme that covers a wide range of subject areas, including physical geography, human geography, cartography, geographic information systems and remote sensing, ecology, hydrology and hydraulics, geotechnical engineering, environmental science, edaphology, soil and water conservation and engineering geology. It hosts two CAS Key Laboratories — the Key Laboratory of Mountain Hazards and Earth Surface Processes and the Key Laboratory of Mountain Surface Processes and Ecological Regulation — and two centres — the Research Center of Mountain Development and the Digital Mountain and Remote Sensing Applications Center.

IMHE specializes in connecting indoor simulation with outdoor experiment to conduct research that has practical application. This research is made possible because of the institute's centres for analysis, testing and debris flow simulation, as well as its network of eight field observation stations located in the upper Yangtze River and Tibet. Of these observation stations, the ecological station on Mount Gongga, Sichuan Province, the debris-flow station in a valley in Dongchuan District, Yunnan Province, and the soil station in Yanting County, Sichuan Province, are listed as State Key Field Observation Stations of China.

There are nearly 300 staff members working at IMHE, including 1 CAS academician, 45 professors and 70 associate professors, as well as over 200 graduate students. The institute has one post-doctoral

research station in physical geography, five doctoral programmes and nine master's programmes. IMHE sponsors two journals that publish research of global importance on mountains and their surrounding lowlands: the *Journal of Mountain Science* in English and *Mountain Research* in Chinese.

The institute is currently recruiting talented scientists devoted to research on hazards mitigation, ecological and environmental protection, and sustainable development in mountainous regions. IMHE will provide necessary assistance for applications to the Hundred Talents Program of the University of CAS, as well as to the Recruitment Program of Global Experts under the Thousand Talents Program and the Thousand Talents Program for Distinguished Young Scholars, according to the applicant's background, potential, age and expertise. We welcome your correspondence.



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