

# WUHAN UNIVERSITY OF TECHNOLOGY

Wuhan University of Technology (hereafter referred to as WUT) is a national key university under the direct administration of the Ministry of Education. It is one of the first batch of universities which have entered the national “211 Project” and the national “Double-Top” Plan for Promoting the Development of World-class Universities and Disciplines. WUT is jointly constructed by the Ministry of Education and the Ministry of Transport. It is also the largest university inside the Ministry of Education in talents cultivation for building materials, transportation and automobile, WUT has become an important base for the cultivation of high-level scientific talents and technological innovation for the three major industrial sectors.

The University has three main campuses, namely, the Mafangshan Campus, the Yujiatou Campus and the South Lake Campus, with a total occupying land area of 267 hectares. Currently, WUT has over 5,400 staff and faculty members, over 36,000 undergraduates, over 18,000 postgraduates and Ph.D. students and about 1,700 international students. It owns 25 academic schools, 4 National Technology Innovation Bases and 4 modern libraries with a collection of 3.2953 million books. Since 2000, WUT has been awarded 23 National Science and Technology prizes, ranking in the forefront of all Chinese colleges and universities. In 2019, WUT was listed in Times Higher Education World University Rankings, QS Asia University Rankings, U.S. News Best Global Universities Rankings and ShanghaiRanking’s Academic Ranking of World Universities.

Since the founding of New China, WUT has cultivated more than 600,000 senior professionals. Over the past decade, the first-time employment rate of graduates has remained above 95%, and about 55% of total employed graduates join the world’s Top 500 enterprises and emerging industries.

Over the years, WUT has made rapid development by following the spirit of “Sound in Morality, Broad in Learning and Pursuing Excellence”; and the principle of “Take the students’ cultivation as our essence, and take academic development as our priority”;. The university focuses on the lofty ideal of building an excellent university to win worldwide recognition and admiration and

exercises the educational concept of “implementing excellent education, nurturing excellent talents and creating an excellent life”. Guided by the WUT Charter approved by the Ministry of Education, WUT is committed to the modernization of the governance system and capability, aiming to rank among the world-class universities with distinctive features.

## Introduction to MSE Discipline of Wuhan University of Technology

### 1. Briefs of WUT’s MSE

Founded in 1958, the Materials Science & Engineering (MSE) discipline of Wuhan University of Technology (WUT) was supported in priority through the “State 211 Project for Higher Education Universities” from 1995 to 2015, and has been supported via the “World-Class University & World-Class Discipline” development plan of China since 2016. WUT’s MSE ranks A+ among 172 leading universities in China (No.1 alongside MSEs of Tsinghua University and Beihang University) in the 4th round national discipline evaluation organized by the Ministry of Education in 2017, and is world top 1% in Clarivate Analytics’ Essential Science Indicators.

WUT’s MSE owns 1 member of Chinese Academy of Sciences, 3 members of Chinese Academy of Engineering, 3 members of Academia Europaea, 1 member of the Royal Academy of Belgium, 1 member of the World Academy of Ceramics, 1 fellow of the Australian Academy of Technology and Engineering, 10 fellows of the Royal Society of Chemistry, American Physics Society and American Ceramic Society. It also owns 23 national high-level talents including recipients of the National Natural Science Foundation of China for Distinguished Young Scholars (equal of NSF Career Awards), and 22 national high-level young talents.

WUT’s MSE has established 2 state key laboratories, the State Key Laboratory of Advanced Technology for Materials Synthesis and Processing and the State Key Laboratory of Silicate Materials for Architectures. The State Key Laboratory of Advanced Technology for Materials Synthesis and Processing was evaluated “Excel-



lence” among 21 state key laboratories in MSE in 2018. It also has built 2 state international joint-research laboratories, and 4 bases of foreign outstanding expertise-introduction for discipline innovation (also known as “111 Project”).

## 2. Representative Achievements and Academics

Targeting the frontiers of global science and technology, and striving to fulfill the significant needs of the country, WUT’s MSE has invested 1.25 billion RMB (190 million USD) in the past 5 years in 6 primary research areas, including green manufacturing of environmentally friendly building materials, key materials serving in extreme environments, high-performance energy conversion and storage materials, and frontiers of interdisciplinary materials science. The representative achievements and academics during 2016–2020 are briefed as follows:

(1) WUT’s MSE has been granted over 330 national key projects, with a total fund of 1.2 billion RMB (185 million USD).

(2) WUT’s MSE has won 5 national science and technology awards, and has published over 4000 papers, including 3 in *Nature*, 1 in *Science*, 46 in the sister journals of *Nature*, *Science* and *Cell*, 69 in *Advanced Materials*. Among these publications, 229 are highly cited or hot papers.

(3) Prof. Qingjie Zhang was elected as member of Chinese Academy of Sciences in 2017. Prof. Lianmeng Zhang was elected as member of Chinese Academy of Engineering in 2017. Prof. Zhengyi Fu was elected as member of Chinese Academy of Engineering in 2021. Profs. Liqiang Mai, Pei Cheng and Shaowen Cao were listed as Highly Cited Researchers by Clarivate Analytics in 2020.

## 3. Talents Cultivation and Representative Graduates

WUT’s MSE aims at cultivating top-notch creative talents with exceptional pursuit and ability, international vision to lead the future development of materials science and materials industry. Currently, there are 5418 students in WUT’s MSE, among which 673 are PhD students and 2289 are master students.

Prof. Ce-Wen Nan, PhD graduate in 1992, was elected as member of Chinese Academy of Sciences in 2011, is now director of Research Institute of MSE in Tsinghua University. Dr. ShouPeng, graduate in 1982, was elected as member of Chinese Academy of Engineering in 2019, is now chairman of the Advisory Committee of International Commission on Glass. Prof. Yi-Bing Cheng, graduate in 1983, was elected as fellow of the Australian Academy of Technology and Engineering in 2007. Prof. James ZhijianShen, graduate in 1978 and professor of Department of Materials and Environmental Chemistry at Stockholm University, was elected as member of the World Academy of Ceramics in 2017. Dr. Yuxian Zhou, graduate in 2003, is the president of China National Building Materials Group Corporation, a leading company in materials industry that ranks No. 187 in Fortune Global 500 in 2020. Dr. Yeqing Li, graduate in 1984, is the president of Huaxin Cement Co., Ltd., cradle of the Chinese cement industry.

## 4. Domestic and International Impacts

Prof. Qingjie Zhang, a member of Chinese Academy of Sciences, has been selected as member of the 1st National Basic Research Strategy Advisory Committee of the Ministry of Science and Technology since 2020, and panel chair of Major Research Plan of Materials Science

of the National Natural Science Foundation of China since 2019.

Prof. Qingjie Zhang received the 2017 Frontiers of Science and Technology – Rustom Roy Lecture Award from the American Ceramic Society, in recognition of his contribution to global energy challenges and developments of thermoelectric materials and systems in China. Prof. Zhengyi Fu, member of Chinese Academy of Engineering, received the Samuel Geijsbeek PACRIM International Award in 2019, for his contribution in the field of ceramics technology that has resulted in significant industrial and academic impact, international advocacy, and visibility of the field. Prof. Liqiang Mai received the Research Excellence Award in the International Conference on Electrochemical Energy Science and Technology in 2018, for his contribution in advanced in-situ characterization of single-nanowire devices for energy storage and conversion. Asso. Prof. Wei Ji, received the 2019 Ross Coffin Purdy Award from the American Ceramic Society in recognition of his contribution to ceramic technical literature in 2017.

16 world-recognized scholars, including 3 Nobel Laureates, have been appointed Lecturing Professors by WUT's MSE since 2016. Faculty members in WUT's MSE have collaborated with these scholars and obtained 19 key international cooperation research projects, as well as published 256 joint research papers in top-level journals including Nature and Science.

WUT's MSE has organized 13 high-level international conferences. Together with MSE of Tsinghua University, WUT's MSE hosted the 1st World University Forum on Materials Science and Engineering Leadership in 2019, and announced <Wuhan Declaration for the 21<sup>st</sup> Century Materials Science and Engineering Sustainable Development>. The representatives of this forum include heads of MSE of Northwestern University, UC Berkeley, UC Los Angeles, UC Irvine, Pennsylvania State University, Georgia Institute of Technology, University of Washington, University of Texas at Austin, University of Central Florida, University of Birmingham, University of Surrey, University of Lorraine, Monash University, Tohoku University, Seoul National University, National University of Singapore, Tel-Aviv University, Indian Institute of Technology – BHU, etc. from 15 countries (USA, UK, France, Australia, Japan, Korea, Singapore, Israel, India, etc.), deans of top 50 MSE schools in China, and presidents of 5 world material research societies (American Ceramic Society, European Ceramic Society, Ceramic Society of Japan, Korean Ceramic Society, and Colombian Materials & Minerals Society).

#### Overview of International School of Materials Science and Engineering

Driven by the great demand for national higher education reformation, the International School of Ma-



World University Forum on Materials Science & Engineering Leadership 世界大学材料科学与工程领导论坛



materials Science and Engineering (hereafter referred to as ISMSE), WUT is aimed to building the top-notch innovative talent training base and knowledge innovation centre of Materials Science and Engineering. In April 2014, ISMSE was founded and approved by the Hubei Provincial Department of Education. In June 2015, ISMSE was selected into the list of the “Network of International Centers for Education” supported by the Ministry of Education of P. R. China and the Ministry of Science and Technology (former State Administration of Foreign Experts Affairs).

ISMSE is devoted to educate a unique class of professional leaders in materials science and engineering who can push the boundaries of knowledge and technology to serve the needs of the nation and the world by providing students with a comprehensive curriculum, which is academically rigorous and provides students with vital skills of critical thinking, communication, teamwork and continuous learning, and also by exposing all students to meaningful international experiences, including lectures by distinguished visiting professors from different countries, short term visits to high level international universities and continuous engagement activities with international students. ISMSE has established the first Material Advantage Chapter in China in 2016. The chapter has won the Chapter of Excellence Award four times from 2018 to 2021, among 102 chapters all over the world.

ISMSE builds the platforms for academic exchanges and interdisciplinary promotions. The World University Forum on Materials Science and Engineering Leadership was held in October 2019 in Wuhan. More than 50 chairs of MSE department around the world attended the forum. It was the first global MSE forum and to discuss relevant issues and devise a strategy that provided the global MSE community with a blueprint for the future, which was announced as <Wuhan Declaration>.

### State Key Laboratory of Advanced Technology for Materials Synthesis and Processing (Wuhan University of Technology)

The State Key Laboratory of Advanced Technology for Material Synthesis and Processing was approved by the State Development Planning Commission in 1987. After state inspection, it was opened for the public in March 1990. The laboratory is under the direct administration of the Ministry of Science and Technology. Currently, Professor Gu Binglin, an academician of the Chinese Academy of Sciences, is the Chair of the laboratory’s academic committee, and Professor Fu Zhengyi, an academician of the Chinese Academy of Engineering, is the Director of the laboratory. The laboratory is located in the Wuhan University of Technology, and it is a state key laboratory that specializes in the field of new materials. The Department of Materials Science and Engineering at the Wuhan University of Technology has been classified as a first-class State Key Discipline, included in the national “985” project of “Build a world-class discipline program,” and is ranked as A+ in the fourth round of national discipline evaluation. Aiming at the global frontier research of materials science and addressing the primary national needs, this laboratory provides a world-class platform for materials compounding and preparation technology, for developing advanced composite materials for national major projects and pillar industries, and for providing support at the national strategic level. Original and systematic research results, with international impact in transformative technologies, frontier new materials, and interdisciplinary fields, have been reported in this laboratory, and therefore, it leads the international development in several strategic frontier new materials. The laboratory fosters the development of global first-class research talent through advanced scientific research in the field of materials science and technology. In addition, the laboratory has

created a culture of international collaborative innovation and has carried out “Win-Win” international cooperative research, thereby enhancing the international influence, attractiveness, and cohesion of the laboratory. The laboratory has achieved a historic breakthrough in the evaluation of the State Key laboratories in the field of materials science.

Centering on the overall vision and objectives, the laboratory focuses on the establishment and development of multi-component, multi-scale, and multi-level composite principles and material design theories that are built on core research platforms comprising material gradient composite technology, in-situ composite technology, nanocomposite technology, and their integrated innovations. Currently, research on five key materials, including advanced composite materials for national major projects and pillar industries, efficient energy conversion and storage materials for new energy technologies, nanocomposite biomaterials for life sciences, information functional materials for information technology, and frontier new materials for transformative technologies, is being carried out in this laboratory. Therefore, the laboratory has established the following five distinctive research directions: gradient composite technology and new materials, in-situ composite technology and new materials, nanocomposite technology and new materials, transformative technology and frontier new materials, and material composite principles and material design.

The laboratory has an active and innovative research team that mainly comprise young and middle-aged researchers. There are hundred permanent staff members, including one academician of the Chinese Academy of Sciences, two academicians of the Chinese Academy of Engineering, one academician of the Royal Academies for Science and the Arts of Belgium, two academicians of the European Academy of Sciences and Arts, one academician of the Australian Academy of Technology and Engineering, one academician of the World Academy of Ceramics, twelve national level researchers, one chief scientist of the National “973” program, five recipients of the national “Outstanding Youth Science Fund,” and thirty recipients of the “national talent Support Plan”. etc. This laboratory has been actively supporting outstanding scholars to visit and conduct collaborative research worldwide in world-class universities and research institutions. In recent years, the laboratory has sent several outstanding young scholars to world-class international universities for more than one year to conduct visits and collaborative research.

The laboratory emphasizes global academic exchange and collaboration. In the last five years, we have hired twenty-five international scholars as honorary and visiting professors in the main research areas, with an aim to create cordial working conditions for world-renowned

scientists to conduct collaborative research in the laboratory.

The laboratory has carried out substantial “Win-Win” collaborations with the University of Michigan; Japan Aerospace Exploration Agency (JAXA); the Institute for Materials Research, Tohoku University (Japan); the Materials Research Center, University of Oxford (UK); Composites Research Center, the University of California (US); and the National Institute of Fuel Cells (Canada), among other internationally renowned research institutions. The Ministry of Science and Technology has established the “International Joint Laboratory of Advanced Technology for Materials Synthesis and Processing,” which is one of the first thirty-three international joint laboratories in China. Additionally, the State Administration of Foreign Experts Affairs and the Ministry of Education have jointly formed three discipline bases supported by the Program of Innovation and Talent Introduction, namely “New Material Composite Technology and Advanced Functional Materials,” “Advanced Preparation Technology and Application Engineering of New Functional Thin Film Materials,” and “Innovation and Talent Introduction Base of Life Composites.” Relying on these important international collaboration platforms, the laboratory has undertaken several state key projects with international collaborations and achieved fruitful results in international collaboration and exchanges.

Currently, the laboratory has a floor area of 25,350 square meters, with several advanced materials synthesis and processing instruments, as well as state-of-the-art instruments specializing in materials structure analysis, characterization, and performance testing. The total estimated value of the instrumentation asset is approximately 350.66 million RMB.

### Introduction to Interdisciplinary Materials

The new scientific journal *Interdisciplinary Materials* (ISSN: 2767-441X) has been launched by Wuhan University of Technology and John Wiley & Sons, Inc in Dec, 2021. The first issue will be published in Jan, 2022 and the journal is free for publication in the first 3 years.

*Interdisciplinary Materials* is an open-access, peer-reviewed, and rapid-publication journal focusing on the interdisciplinary researches between materials science and other disciplines, such as physics, chemistry, mathematics, mechanics, biology, energy, environment, information, engineering, etc. The journal aims at reporting cutting-edge developments across science and technology around the world.

*Interdisciplinary Materials* is expected to take an interdisciplinary, frontier, and integrated approach to all areas of materials research while cultivating the exchange

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of ideas between scientists involved in the different disciplines. Readership will include physicists, chemists, mathematicians, mechanics, biologists, and energy, environment, materials scientists, engineers from academia and industry as well as policymakers.

Interdisciplinary Materials invites you to submit high-quality, innovative full-length research articles, rapid communications, reviews, perspectives, comments, and other editorial content of general interest to the field of interdisciplinary materials.

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