

School of Biomedical Engineering

<http://bme.sjtu.edu.cn/Index.aspx>

I . An Introduction to Disciplines and Main Research Fields

The school of BME has dedicated to the strategic development of Biomedical Engineering and Medical Science cross-disciplines since merging with the former Shanghai No. 2 Medical University in 2005. MED-X Academy, primarily engaged in Transformative Medical Engineering and Medical Science cross-disciplines, was established in November, 2007. On April 8, 2011, the University's 115th anniversary, the School of BME was established by the merge of SJTU Med-X Research Institute, an institute dedicated to interdisciplinary research on medicine and engineering/physical sciences, and the former SJTU Department of BME.

BME has two primary disciplines: Biology and Biomedical Engineering. Shanghai Jiao Tong University (SJTU) established the Discipline of Biomedical Engineering (BME) in 1979, which was one of the first universities in China to establish the Discipline of BME. The school was authorized to provide the master degree in 1981 and the doctoral degree in 1990, founding the postdoctoral research center in 1998. Since the school's founding, with the spirit of "Dare to become a pioneer, and search for excellence", the faculty and staff of BME have made significant progress in research, education, and development. It has constantly been a leading BME program in China; The discipline is a key discipline of our nation, which has been ranked as the top three in all of the three national evaluations since 2002.

Academic Areas

| Areas | Research Directions |
|----------------------------|---|
| Biomedical Instrumentation | Our technological focuses include techniques for physical therapy and medical devices, especially in the field of ultrasound and electromagnetic wave; thermo-physical studies of cancer; basic thermo-physics; synchrotron radiation X-ray-based imaging of tumor angiogenesis; influences of trace metals on tumor angiogenesis; design and fabrication of microsystems, semi-conductor chips, and microfluidics for Biomedical Instrumentation biomedical applications in imaging; cancer diagnosis; and non-invasive monitoring of circulating tumor cells by in-vivo flow cytometry. |

(continued)

| Areas | Research Directions |
|----------------------------------|---|
| Neuroscience and Engineering | The mission of the Area of Neuroscience and Engineering is to develop and apply novel technologies for monitoring and understanding the brain and nervous system in both experimental and clinical neurosciences, as well as to develop neural prostheses based on the understanding of the neural mechanisms underlying visual cognition. |
| Medical Imaging and Information | The mission of the Medical Imaging and Informatics Area is to develop novel medical imaging, medical image processing and image analysis methods and technologies for diagnosis and therapy of diseases, and to obtain the accurate structural and functional information of living body. |
| Nano-Biomaterials | Biomaterials are used diversely in diagnostics, therapeutics, rehabilitation and tissue engineering. Nanotechnology is an emerging area that will have great impact on future biomedicine. There are three major research directions in the Nano-Biomaterial Area of the School of Biomedical Engineering: nanoparticles, tissue engineering and Biomaterials research. |
| Systems Biology and Medicine | The main focus is to apply “systems” approach, combining multiple disciplines, from genomics to informatics to biophysics, to address fundamental questions in biology and medicine. In addition, the Area is also responsible to initiate an innovative instrumentation center, named Bio-ID Center, to develop cutting edge technologies in imaging, nanotechnology and precision analysis. |
| Biological Sciences and Diseases | The mission of the Area of Biological Sciences and Diseases is to advance biomedical research with a passion for discovery of mechanisms and therapies of major diseases like cancer and stroke, to provide biomedical engineering students with cutting-edge knowledge education, research skill and aptitude training in biological sciences in an interdisciplinary and collaborative nature, to extend biomedical education to the public and improve their health science concept. |

II. Faculty

1. Overview of Faculty

In the School of BME, currently there are 80 full-time faculty members, including 19 professors, 28 associate professors, and 11 special researchers. Our faculty members have received numerous accolades and honors, including one academician in the Chinese Academy of Engineering, two of the Thousand Talents Program supported by the Central Organization Department, one of the Thousand Talents Program of Shanghai, three of the Thousand

Talents Program (youth), two winners of the National Science Fund for Distinguished Young Scholars, one distinguished professor of Chang Jiang River Scholar, two chief scientists of the Major National Basic Research Program (973), four chair professors of SJTU, and three distinguished professors of SJTU. The proportion of doctors has occupied 98.3% and almost 50% teachers have overseas study experiences. The International Academic Committee composed of famous experts in the field of international biomedical engineering was initially set up and has been playing a significant role in the school's developmental strategy and teachers' employment.

2. Renowned Professors

| NO. | Name | Title | Academic Areas |
|-----|---------------|--|----------------------------------|
| 1 | CHEN Yazhu | Member of Chinese Academy of Engineering | Biomedical Instrumentation |
| 2 | GAO Weiqiang | Winner of the Thousand Talents Program, "K. C. Wong" Endowed Chair Professor, chief scientists of the Major National Basic Research Program (973) | Biological Sciences and Diseases |
| 3 | SHAO Zhifeng | Winner of the Thousand Talents Program, "K. C. Wong" Endowed Chair Professor | Systems Biology and Medicine |
| 4 | YANG Guoyuan | "K. C. Wong" Endowed Chair Professor | Biological Sciences and Diseases |
| 5 | XU Xuemin | Distinguished Professor of Chang Jiang Scholars Program, winner of the National Science Fund for Distinguished Young Scholars, chief scientists of the Major National Basic Research Program (973) | Biomedical Instrumentation |
| 6 | WEI Xunbin | Winner of the National Science Fund for Distinguished Young Scholars, distinguished professor of SJTU | Biomedical Instrumentation |
| 7 | HE Shigang | Distinguished professor of SJTU | Biological Sciences and Diseases |
| 8 | WANG Jinye | Member of the Hundred Talents Program supported by Chinese Academy of Sciences | Nano-Biomaterials |
| 9 | YE Jian | Member of the Thousand Talents Program (youth) | Nano-Biomaterials |
| 10 | GAO Hao | Member of the Thousand Talents Program (youth) | Medical Imaging and Information |
| 11 | DING Xianting | Member of the Thousand Talents Program (youth) | Nano-Biomaterials |

III. Achievements

During the last four years, BME has hosted and participated in two main programs, seven subjects of the Major National Basic Research Program (973), three of the National High Technology Research and Development Program (863) of MOST, and 66 projects of NSFC, including six key and major projects. The faculty members of SJTU BME Discipline have made significant achievements in research and public service; Several faculty members obtained research awards including the First Prize of National Science & Technology Advancement Award; the faculty members have 284 research articles published in leading international journals: *Nature Communications*, *Gastroenterology*, *Advanced Materials*, *Stroke*, and *IEEE Transactions on Biomedical Engineering*. Additionally, multiple major international research conferences have been organized by the faculty of the school, 40 of which were authorized patented invention.

IV. International Collaboration

BME's main educational purpose is to cultivate international leaders, promoting the internationalization of teaching, research, and teacher's quality. Each year, the school invited a large number of overseas professors for lectures, including the Nobel Prize winner, the American academician of Academy of engineering, the American academician of Academy of Medical Sciences, and other international famous scholars. The school has founded two International Summer Schools (SJTU-KTH Summer School and IEEE EMBS international summer school on neural engineering).

The school of Biomedical Engineering has promoted international cooperation and students exchanges, inviting international faculty each year to participate in teaching. And we has signed many joint degree graduate programs with a number of foreign universities such as Kungl Tekniska Hogskolan, Drexel University, Heidelberg University, and Loughborough University, etc. So far, there are 15 graduates courses been taught in English.

1. Joint Education Programs

- SJTU-Drexel Dual Degree Ph. D. Program
- SJTU-KTH Dual Degree Ph. D. Program
- SJTU-KTH Dual Degree Master Program
- SJTU-Heidelberg Dual Degree Master Program
- SJTU-Northwestern Dual Degree Master Program
- SJTU-EMSE Dual Degree Master Program
- SJTU- Heidelberg Dual Degree Ph. D. Program

2. Student Exchange Programs

- KTH Undergraduate Exchange Program

- Minnesota University Summer Program
- Johns Hopkins University Summer Program
- University of Illinois Summer Program

V. Platforms for Scientific Innovation

- Shanghai Engineering Research Center of Medical Equipment and Technology
- Engineering Research Center of Digital Medicine and Clinical Translation, Ministry of Education
- SJTU Institute of Rehabilitation Engineering (IRE)
- Research Institute of Biomedical Equipment
- Nano Biomedical Research Center
- Renji Clinical Stem Cell Research Center
- Med-X-Ruijin Micro PET/CT Joint Research Center of Shanghai Jiao Tong University
- MED-X Research Institute--Shanghai Mental Health Center Joint Neuroimaging Center
- Shanghai Med-X Engineering Center for Medical Equipment and Technology —Shanghai Sixth Hospital Center
- Research Center of Metabolic Diseases
- Research Center of medical instrument detection and inspection

VI. Distinguished Alumni

KUN Hu, the chairman and CEO of Alpha Imaging Technology INC.

CHEN Minghe, the Co-CEO of Mindray Medical International Limited,

YANG Yihong, tenured senior investigator of NIH

XU Guanghan, the chief scientist of Beijing Xinwei Telecom Technology Inc.

XU Xuemin, vice-president of Shanghai Jiao Tong University