

School of Mechanical and Electrical Engineering

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Group photo of staff

1.1 Mission

To cultivate innovative and pragmatic talent with moral integrity and to put quality teaching as our top priority.

1.2 About

The School of Mechanical and Electrical Engineering (SMEE) can be traced back to 1983 when Italian Universities Association and Guangzhou University jointly established the Department of Mechanical and Electrical Maintenance and the department's partners in Italy invested 4 million US dollars for the joint program. It is with these institutions that China started to train international talented people in mechanical and electrical maintenance engineering. The school has 6 undergraduate programs, namely, Mechanical Design, Manufacturing and Automation, Robotics Engineering, Electrical Engineering and Automation, Electronics and Information

Engineering, and Communication Engineering and Industrial Design. It has 2 Master's programs of first-level discipline: Mechanical Engineering, and Information and Communication Engineering. In addition, the school has 3 engineering master's programs: Mechanical Engineering, Electronics and Information Engineering, and Transportation Engineering. In 2011, the undergraduate program of Mechanical Engineering was selected as the national specialty program. In 2019, Mechanical Design and Manufacturing and Automation program were selected as the national first-class undergraduate programs. Electrical Engineering and Automation undergraduate program is the provincial pilot comprehensive reform program and the first-class undergraduate program in Guangdong Province.

The school has 140 faculty members, including 1 dual-employed academician of Chinese Academy of Engineering, 1 National Excellent Young Scholars, 1 expert of National Key Talent Program, 2 experts of National One Million Talents Project, 4 receivers of the State Council special government allowance, 1 National Model Teacher, 2 New Centaury Outstanding Talent of the Ministry of Education, 1 Guangdong Special Support Plan Famous Teacher, and 2 excellent teachers in South Guangdong.

An integrated talent training program based on the concepts of CDIO Engineering Education and the Excellent Engineer Training Plan has been established in this school. Over the past five years, the school has undertaken more than 10 provincial and national education projects, including National Specialty Professional Project, Provincial Talent Training and Innovation Pilot Zone Project, and Provincial Model for Pilot Teaching Center. Other than this, the school has 3 excellent teaching groups, and obtained 20 teaching reform projects, 2 excellent resource sharing courses, 6 provincial teaching achievement awards and 2 key practice bases approved by Guangdong provincial government.

In recent five years, the school has undertaken 127 research projects and 96 industry application projects, such as NSFC Key Project, National Key Research and Development Plan, and National Technology Support Plan, with the total funding exceeding RMB 4.5 million. The school has obtained about 15 national, provincial and municipal research awards and has established 1 Innovative Education Department Team, 5 Guangdong Engineering and Technology Research Centers

supported by Guangdong provincial government and 6 research bases or key laboratories supported by Guangzhou municipal government. The school has published 18 monographs and 587 papers and applied for 670 patents. Engineering and Computer Science programs are listed among the top one percent in global ESI (Essential Science Indicators) in 2018.

The school puts teaching as its top priority, attaches great importance on practice and aims to cultivate knowledgeable, skilled and innovative professionals and leaders with international vision and social responsibility. The school maintains close relations with many internationally renowned universities from America, Europe and Australia, and has launched joint training and exchange programs with them. At present, there are 2,388 undergraduate and 223 postgraduate students at the school. The school is an important talent training base and innovative research base in the areas of mechatronics, electronics and automation in south China.

2. Academic Programs

2.1 Undergraduate Programs

(1) Mechanical Design, Manufacturing and Automation

Major courses: engineering drawing, mechanics (including theoretical mechanics and material mechanics), thermal fluid (fluid mechanics and engineering heat transfer), engineering materials, machinery theory, mechanical design, mechanical manufacturing technology, electrical and electronic technology, interchange ability and measurement technology, hydraulic and pneumatic technology, single-chip technology and mechanical control foundation.

(2) Electrical Engineering and Automation

Major courses: circuit, analog electronics technology, digital electronics technology, automatic control theory, microcontroller theory and interface technology, power electronics technology, electromagnetic field, electromechanics, power system analysis and high voltage technology.

(3) Electronics and Information Engineering

Major courses: circuit, analog electronics technology, digital circuit and logic design, signal and system, digital signal processing, C language programming, single chip microcomputer theory and interface technology, electromagnetic field and electromagnetic wave, communication system theory and pattern recognition.

(4) Robotics Engineering

Major courses: mechanical drawing, engineering mechanics, C language programming, matrix theory and MATLAB programming, circuit, robotics, basis of mechanical design, automatic control theory, analog electronics technology, robotic system modelling and simulation, basis of machine vision, signal and system, mobile robotic technology, human-computer interaction theory, robot behaviour planning, robot intelligent technology and industrial robot applied technology and innovative practice theory.

2.2 Master Programs

(1) Mechanical Engineering

Major courses: advanced engineering mechanics, modern control theory, mechanical manufacturing system engineering, advanced processing technology and manufacturing equipment, theory and application of CAD/CAM/CAE, mechanic fault diagnosis, mechanical vibration and noise control, digital signal processing, electromechanical control engineering, mechanism analysis and synthesis, mechanical optimization design, mechanical innovation design methodology, mechanical system dynamics, micro-electromechanical system design and manufacturing, modern numerical control technology, advanced sensor technology, object-oriented programming, reverse design and rapid manufacturing, laser processing and application and robotic technology.

(2) Information and Communication Engineering

Major courses: modern digital signal processing, modern digital communication, communication system modeling and simulation, wireless communication theory, digital voice processing, DSP technology, EDA technology, convex optimization,

intelligent video analysis, embedded system application and digital integrated circuit design.

3. Faculty and Research

3.1 Well-known Experts and Scholars



Professor **DUAN Baoyan** (PhD)

Academician of Chinese Academy of Engineering

Prof. Duan is academician of Chinese Academy of Engineering, member of General Equipment and Satellite Payload Expert Group and member of China Electronics Technology Group (Advanced Manufacturing Technology Expert Group). He has been engaged in teaching and research in the field of electromechanical engineering. He has broken new grounds in electronic equipment coupling with electromechanical in China. He has established a coupling theoretical model among electromagnetic field, structural displacement field and temperature field of electronic equipment. This model is able to reveal effects of the mechanism of mechanical structure on electrical performance. Its results have been applied in many major national projects and equipment.



Professor **ZHANG Chunliang** (PhD)

Supervisor of PhD and postgraduate students

E-mail: zhangcl@gzhu.edu.cn

Prof. Zhang is Dean of School of Mechanical and Electrical Engineering, Director of the Guangdong Electromechanical Equipment Condition Monitoring and Automation Engineering Center, and Director of Guangzhou Electromechanical Equipment

Condition Monitoring and Control Key Laboratory. His research areas are intelligent manufacturing and robotics, condition monitoring and fault diagnosis, intelligent algorithm, computer numerical control technology, micro-manufacturing technology, etc. Prof. Zhang has published about 150 papers and monographs. He has obtained funding from NSFC, National 863 Plan and Natural Science Foundation of Guangdong Province. He is co-editor of *International Journal of Mechanical and Industrial Engineering*, editorial board member of *Mechanics and Advanced Technologies*, and chair of a technical program committee and co-chair of a number of international conferences.

Research progress:

(1) Professor Zhang developed and applied rail grinding robot system for high speed railway

(a) High precision rail robot grinding technology: weld identification and measurement, grinding tool calibration and compensation and adaptive force control technology.

(b) Automatic programming system of rail grinding robot: online sensor information collection, integration of grinding process and graphic automatic programming.

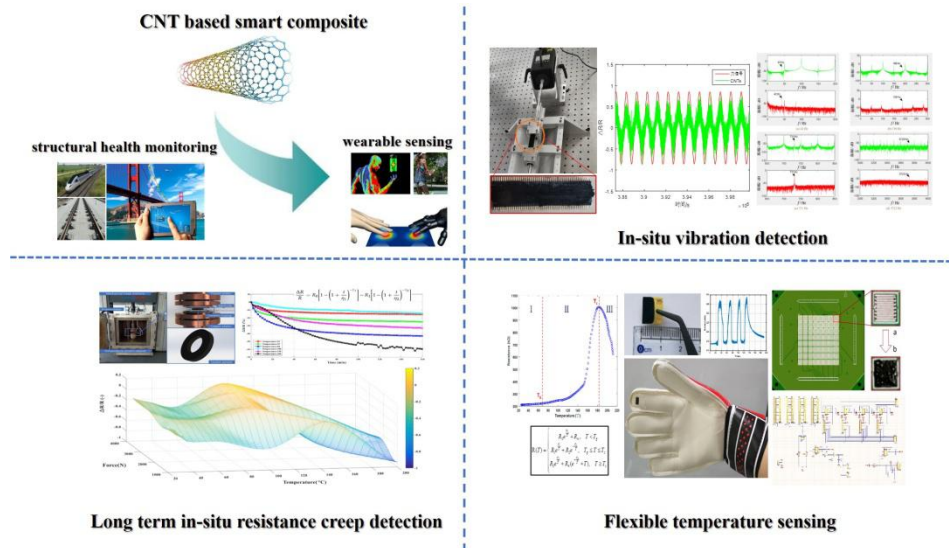
(c) Robot grinding workstation which has been operated in the rail welding plant, with working efficiency of less than 300s for one weld and less than 0.1% poor grinding rate.



(2) He conducted research on long term in-situ stress testing of carbon nanotubes thermosetting composites

Carbon nanotube-based conductive polymer composites showed great potentials for self-sensing and in situ structural health monitoring systems. A model considering both the destruction and recovery processes of the conductive network inside the conductive polymer composites was established. The long-term resistance variation

can be predicted with the model. In addition, the project team developed high-sensitivity wearable temperature sensor gloves based on carbon nanotube flexible intelligent composite materials, which realized real-time detection of environment (contact) temperature.



Professor **ZOU Tao** (PhD)

Supervisor of PhD and postgraduate students

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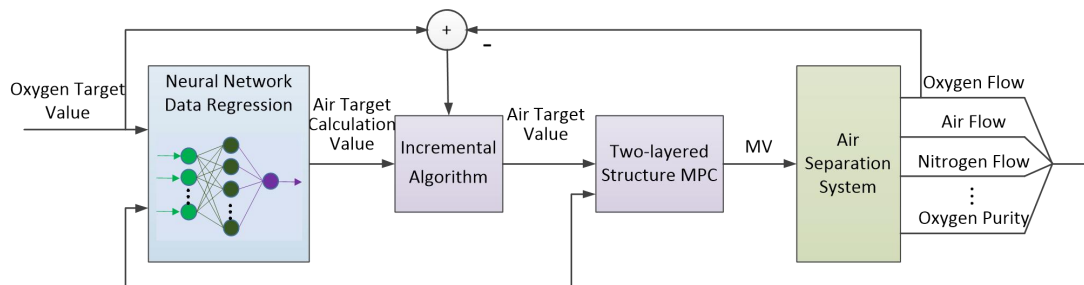
Prof. Zou's research areas are advanced process control and real time optimization and their industrial applications. He has undertaken 4 NSFC projects and published about 80 SCI- and EI-indexed papers and was granted 6 China Invention patents. He is author of the book *MPC: An Introduction to Industrial Application*. He has presented two-layered structure model predictive control theory and technology for the first time, designed the complete technology route of model predictive control and developed the industrial software.

Research progress:

(1) Facing the execution layer of the intelligent factory of chemical enterprises, Prof. Zou is the first person in China who proposed the two-layered structure predictive control theory and technical system, which achieved real-time dynamic optimal

decision-making and control at the operational layer in modern industrial production process. The works lay a solid foundation for comprehensive automation in the intelligent factory of chemical enterprises.

(2) He developed an automatic load change coordinated control system based on two-layered predictive control for strongly coupled and nonlinear large-scale air separation units.



The structure of automatic load change coordinated control system



Professor **WEN Guilin** (PhD)

Supervisor of PhD and postgraduate students

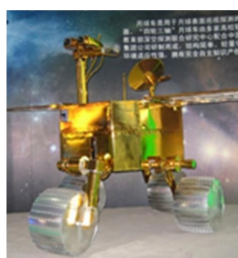
E-mail: glwen@gzhu.edu.cn

Prof. Wen is honored NSFC Distinguished Young Scholar, young and middle-aged expert of the national “one million talent project”, expert enjoying the Special Allowance of the State Council and expert of New Century Outstanding Talent of the Ministry of Education. His research areas are R&D of special equipment, dynamics and intelligent control, and mechanical design. He is Director of two research centers: the Special Equipment Pilot Technology Center, and the Intelligent Equipment and Network System Center. He has undertaken 6 NSFC projects (including 1 Distinguished Young Scholar Project and 1 Key Project), 2 National 863 Plan and about 40 industry product development projects. He has published about 170 papers (about 110 SCI-indexed papers). He was granted 18 invention patents and 1 PCT

patent. He is winner of National Science and Technology Progress Award, 4 provincial science and technology awards and 1 China University Automobile Innovative Talent Prize (conferred by the Ministry of Education and General Motors Company). He has been employed by the National Aerospace Department as the “Model Deputy Chief Designer” of Chang’e-3 (lunar rover) mobile subsystem.

Research progress:

He participated in the R&D of key devices of Chang’e 3 and Chang’e 5 for the national lunar exploration project. He was invited to exhibit the developed lunar rover in the “National Day 60th Anniversary Achievement Exhibition” of the People’s Republic of China. His group won the champion of First China Smart Car Challenge.



The developed lunar rover and unmanned smart car; laboratory equipment: ICP micro-nano etching machine.



Professor **LIU Xiaochu** (PhD)

Supervisor of PhD and postgraduate students.

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Prof. Liu is winner of Chinese Scientist and Lingnan Excellent Scholar. He is also one of the experts of Nanjing 321 Leading Technology Entrepreneurship Talent program. He is Director of 5 research centers, including Guangdong Intensive Micro-nano Grinding Processing Centre, Guangdong Water, Fertilizer and Intelligent Solar Energy Irrigation Centre, and Guangdong Intelligent Solar Energy Irrigation

Equipment Science and Technology Innovation Centre. He has published about 160 papers (with 70 SCI- and EI-indexed papers) and 2 books. He has gained 136 patents (about 50 invention patents) and formulated 11 technological standards. He has been awarded the first prize of Guangdong Agricultural Technology Promotion Award, the National Agricultural Water Saving Science and Technology Award and 5 other national and provincial awards.

Research progress:

(1) **Manufacturing technology of wear resistance and life extension:** He put forward the theory, method and technology of three-phase (gas, liquid and solid) mixed flow intensified grinding process and developed the “intensified grinding machine” as novel equipment. He also developed the technology of ultrahigh-speed centrifugal grinding, pre-stressed hard cutting grinding and non-circular extrusion machining. Through the innovation of manufacturing principle and method, he fulfils the objective of “high temperature corrosion resistance, wear resistance and life extension”, which is widely used in the core parts and die industries such as bearings.

(2) **Innovative bearing design theory:** He established the design method and theory of double row angular contact ball bearing and linear ball bearing with external concave and internal convex. He proposed the new formula and algorithm of clearance calculation, shaft radial clearance conversion and clearance fit rate control for vertical double row angular contact ball bearing, which have an important impact on the bearing industry in China and are widely applied in Mechanical industry.

(3) **Irrigation machinery and automation:** He proposed a new dry deep time-domain irrigation control method, invented a solar intelligent automatic irrigator and a sensor material for surface moisture self-renewal and solved the issue of probe passivation. All relevant technologies were commercialized.



The developed “intensified grinding machine”



Professor **HUANG Weiqing** (PhD)

Supervisor of PhD and postgraduate students.

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Prof. Huang is an expert of the national “one million talent” project and New Century Outstanding Talent of the Ministry of Education. He enjoys the special allowance from the State Council. His research areas are piezo motors, precision drive and control of piezoelectric and electromechanical control. He has undertaken a number of NSFC projects including numerous key projects. He has undertaken 1 Ministry of Education Science and Technology Innovation Key Project and 1 Natural Science Foundation of Jiangsu Province Key Project. He has published about 150 papers and has been granted 12 patents. He has been awarded Ministry of Education Science and Technology Progress Award (second prize) for “Development of HEV series high energy exciter” project. He was awarded National Technology Invention Award (second prize) for his “New ultrasonic motor technology” and “Long stroke, high precision, fast response piezoelectric linear motor” projects. He has won gold medal from Geneva International Invention Expo for his “Multi-foot clamping piezoelectric linear motor and its precise motion control” project.



Professor **Marcelo A. SOTO** (PhD and Adjunct Professor)

Supervisor of PhD and postgraduate students

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Prof. Marcelo A. Soto is Adjunct Professor under the Hundred Talent Program of Guangzhou University. He received his M.S. degree in Electronic Engineering from Universidad Técnica Federico Santa María, Valparaíso, Chile, in 2005, and his PhD degree in Telecommunications from the Scuola Superiore Sant Anna, Pisa, Italy, in 2011. From 2010 to 2011, he was Research Fellow at Scuola Sant'Anna, where he worked on distributed optical fibre sensors based on Raman and Brillouin scattering. Later, he was a Postdoctoral Researcher at the EPFL Swiss Federal Institute of Technology of Lausanne in Switzerland, where he worked on high-performance Brillouin and Rayleigh distributed fibre sensing, nonlinear fibre optics, optical signal processing, and optical Nyquist pulse generation. Since March 2018, he has been a Tenure-Track Assistant Professor at Universidad Técnica Federico Santa María, Valparaíso, Chile.

His main research areas are optical fibre sensors, optical communication systems, distributed optical fibre sensing based on Raman, Brillouin and Rayleigh scattering, applications of stimulated Brillouin scattering, optical signal processing, optical amplification, microwave photonics and nonlinearities in optical fibres. He is author or co-author of over 170 papers in international journals and conferences, 3 book chapters and 8 patents in the fields of optical communications and optical fibre sensing. He is member of the Optical Society of America (OSA) and in the Board of Reviewers of major international journals in photonics (Nature group, OSA, IEEE, Elsevier). He is Associate Editor of the *Optical Fiber Technology Journal* (Editorial Elsevier).

Research progress:

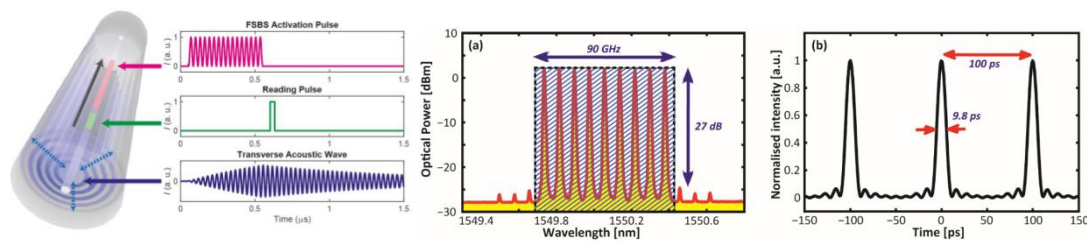
(1) *Demonstration of distributed fibre sensor based on forward Brillouin scattering for the detection of liquid and gaseous substances in the fibre surroundings* (published on Nature communications, 2018).

(2) *Realisation of a distributed optical fibre sensor capable of resolving one-million independent points within an acquisition time of a few minutes* (top downloaded paper in Optics Letters during May 2017).

(3) *Invention of a technique based on image and video processing to enhance the performance of distributed optical fibre sensors by 2 orders of magnitude (patent granted in 2015, published on Nature Communications, 2016) .*

(4) *Demonstration of more than two-million resolved points in a distributed optical fibre sensor enabling measurements with 8.3 mm spatial resolution over a distance of 17.5 km (published on Nature Light: Science & Applications, 2016) .*

(5) *Invention and development of a technique to generate almost-ideal optical sinc-shaped Nyquist pulses, based on the direct synthesis of a rectangular-shape, phase-locked optical frequency comb (patented granted in 2015, published on Nature Communications, 2013)*



Measure transversal acoustic wave in a distributed way along optical fibres; Generation of optical Nyquist sinc-pulses with exceptional quality.

3.2 Key Research Projects

The school carries out various research on hot topics and focuses on development priorities of the national and provincial manufacturing industry. The research areas include “electromechanical control and intelligent monitoring”, “design and theory of high-end equipment”, “green processing and intelligent manufacturing”, “micro electro-hydraulic engineering”, “large-scale network system and equipment”, which cover the areas of mechanical engineering, artificial intelligence, information and control engineering, material science and engineering, and mechanics. The school has 5 provincial engineering research centers including Guangdong Electro-mechanical Equipment Condition Monitoring and Automation Engineering Center, Guangdong Intensive Micro-nano Grinding Processing Center, and Guangdong Intelligent Solar Energy Irrigation Equipment Science and Technology Innovation Center. The school has 6 municipal research bases including Robot and Intelligent Equipment Research

Platform, and Information Processing and Transmission Key Laboratory. Some of the key research projects of the school are:

(1) Movement stability of absolute space positioning and flexible vibration isolation principle of imitation chicken neck, NSFC Key Project, 2019.01-2023.12, Undertaken by Professor Wen Guilin.

(2) Basic research on design and manufacturing of industrial robot bearing ring based on controllable intensified grinding, NSFC Joint Funds Key Project, 2017.01-2020.12, Undertaken by Professor Liu Xiaochu.

(3) EU Horizon 2020 Project, Undertaken by Professor Yue Shigang.

4. Awards

4.1 Achievements

In 2019, the school's program of mechanical design, manufacturing and automation was selected as the national first-class undergraduate program. The school has been awarded the Advanced Teaching and Management Institution of Guangzhou University for five consecutive years. The employment rate of the school's graduates has constantly been above 94% for several years. The Engineering discipline won Top 1% of ESI (Essential Science Indicators) disciplines in the world universities in 2018.

4.2 Honors

(1) Academic Staff

Professor Zhang Chunliang: Special Allowance of the State Council (2015), Guangdong Special Support Plan Famous Teacher (2017), Guangdong Education and Teaching Achievement Award (first prize in 2018 and 2020).

Professor Wen Guilin: NSFC Distinguished Young Scholar (2012), National Science and Technology Progress Award (second prize, 2013), National One Million Talent Project (2014), Special Allowance of the State Council (2016), commemorative medal

from “The 70th Anniversary of the Founding of the People’s Republic of China” (2019).

Professor Huang Weiqing: commemorative medal from “The 70th Anniversary of the Founding of the People’s Republic of China” (2019).

(2) Student representatives or groups

Cheng Jianxiang: one of the top 10 students of Guangzhou University in 2018-2019.

2017: 15th National University Student “Challenge Cup” Extracurricular Academic and Technological Works Competition (third prize).

2018: 6th National University Student Engineering Training and Comprehensive Ability Competition (Guangdong sub-competition, first prize), National University Student Entrepreneurship Competition (bronze medal), Guangdong University Student Electronic Design Competition (2 first prize), Guangdong University Student “Challenge Cup, Create Youth” Entrepreneurship Competition (gold medal).

2019: National University Student Extracurricular Academic and Technological Works Competition (first prize), 15th Guangdong University Student “Challenge Cup” Extracurricular Academic and Technological Works Competition (1 special prize, 1 first prize, 1 second prize and 1 third prize).

5. Alumni



Mr. Pan Kanglin

Mr. Pan is a graduate of the Applied Electronics program, the class of 1991 . He is currently chief executive officer and senior engineer of Guangdong Information

Engineering Co., Ltd. The company has developed into a high technology enterprise with about 300 employees. The company is mainly engaged in business related to software development and application such as OA (automatic office system), modern data processing, engineering service platform, and QR code. At present, the “HGJ” project (core electronic components, high-end chips, basic software) developed by the company has become one of the major national projects.

Mr. Luo Yungang



Mr. Luo is a graduate of the class of 1998. He is currently general manager of Guangzhou Aigao Cultural Communication Co., Ltd. The company’s predecessor, the Aigo Digital Audio Production Co., Ltd. was founded by him in 2001. The company is now a leading independent recording company in Guangzhou and has cooperative relations with many famous brands and international 4A advertising companies, including cinema animated films such as “Mermaid”, “Cinderella”, and “Wizard of Oz”.