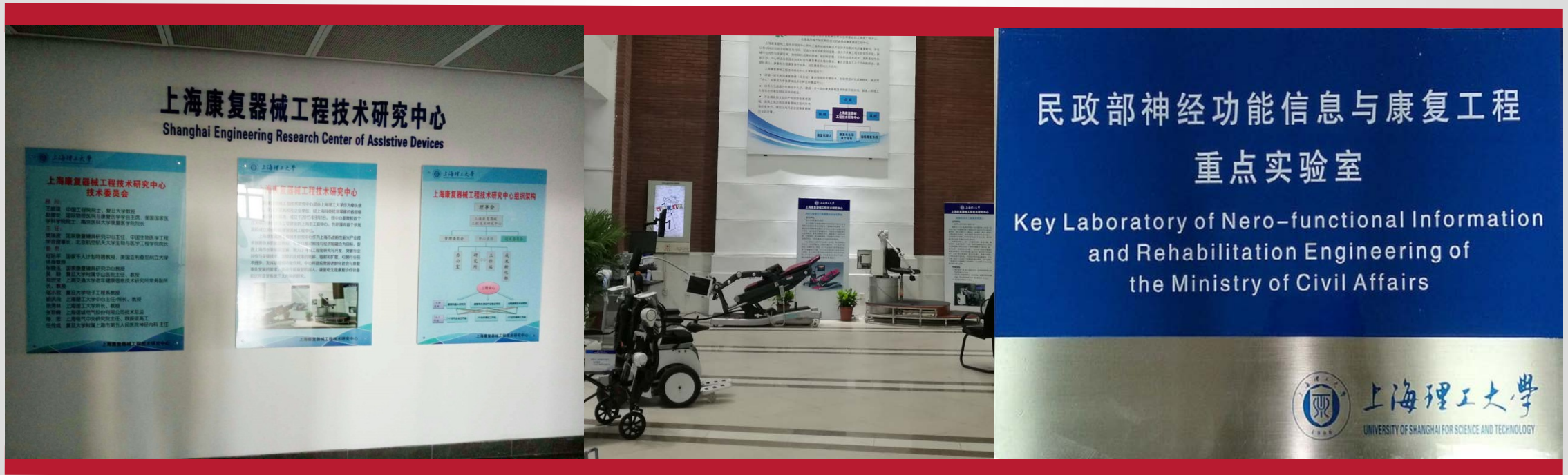




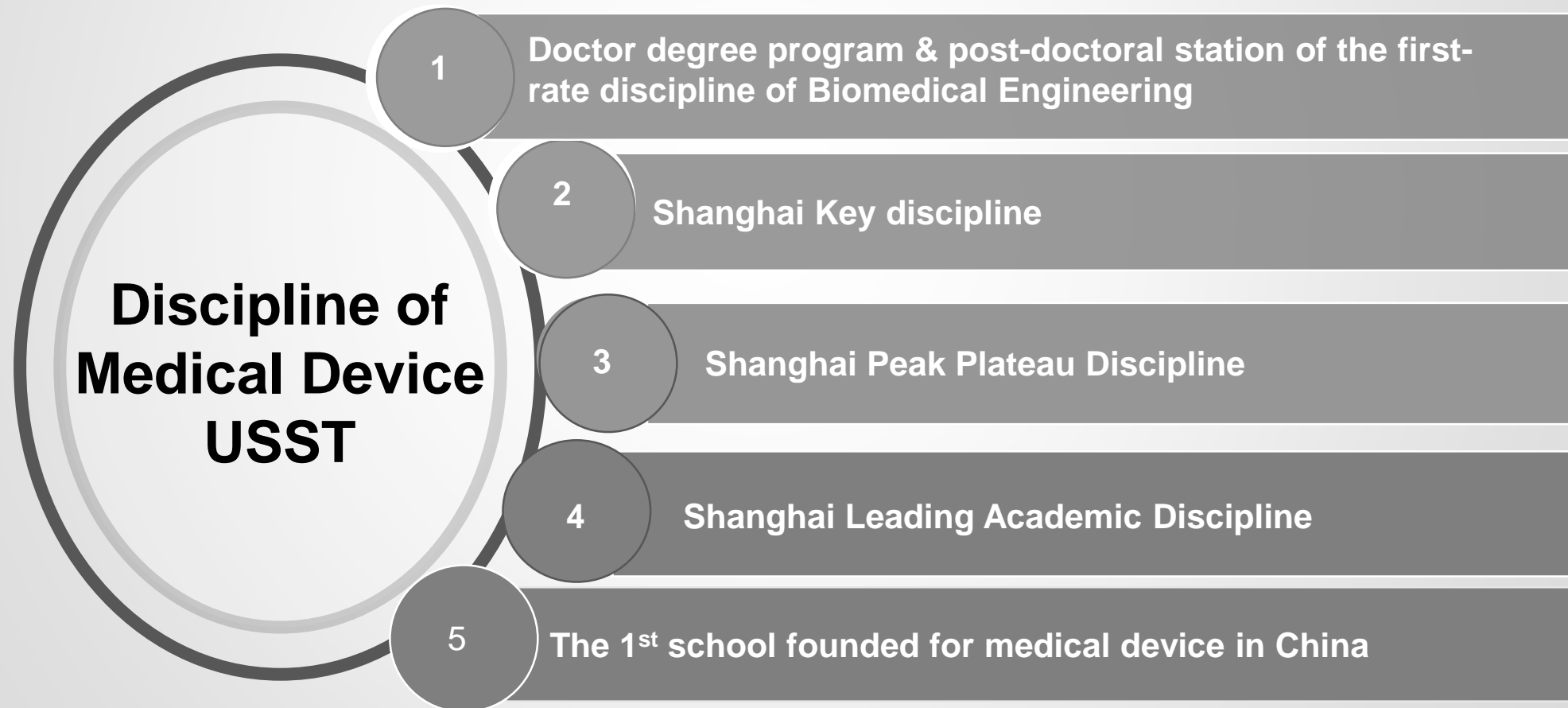
Shanghai Engineering Research Center of Assistive Devices

University of Shanghai For Science and Technology
(USST)

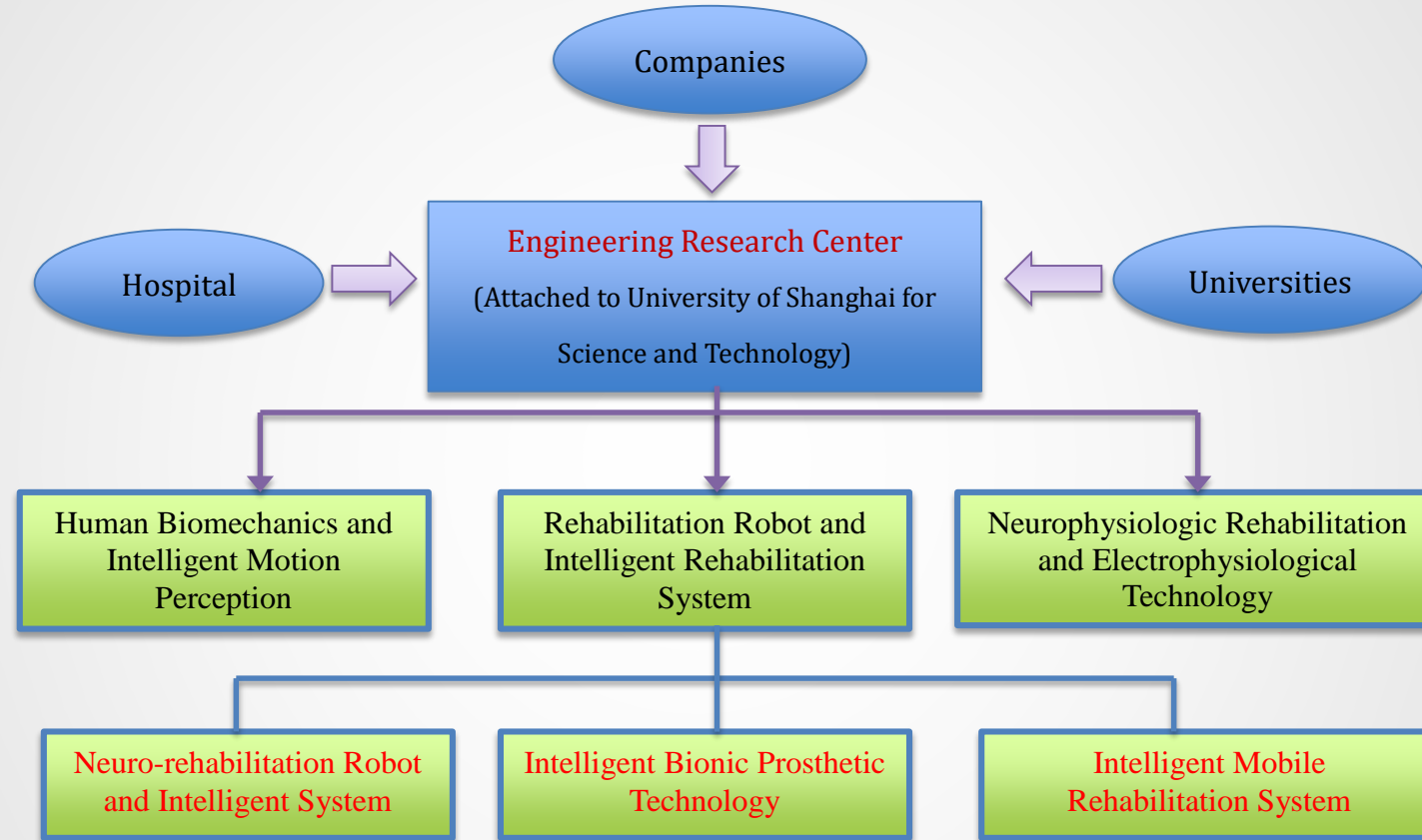
- Among the major directions of International Laboratory of Medical Device & Rehabilitation Engineering of USST
- Basing on 2 provincial research platforms of rehabilitation engineering
 - Shanghai Engineering Research Center of Assistive Devices (SERCAD)
 - Key Laboratory of Neural-functional Information & Rehabilitation Engineering of the Ministry of Civil Affairs



Basing on **Superior Discipline: Biomedical Engineering**, School of Medical Instrument & Food Engineering, USST



Shanghai Engineering Research Center of Assistive Devices



Initiated in 2015 by the Shanghai Municipal Science & Technology Commission

Approved in 2018 by the Shanghai Municipal Science & Technology Commission

The 1st Research Center of Rehabilitation & Assistive Devices established by university in China

Shanghai Engineering Research Center of Assistive Devices (SERCAD)

Principle Institutions

上海
交通
大学

University of Shanghai for
science and Technology

Cooperation Institutions

上海
战略
创新
联盟

Shanghai Strategic Innovation
Alliance of Electrophysiology
and Rehabilitation Technology

诺
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公
司

Shanghai Nuocheng Lim Co.
Ltd

上
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Shanghai Electric

上
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合

Shanghai Jinghe Lim Co. Ltd

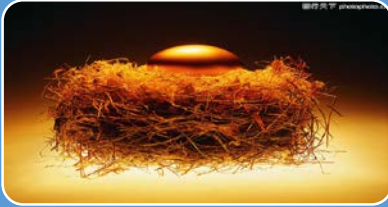
Fudan University

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Shanghai Jiao Tong University

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Huashan Hospital



Incubation & Innovation Center of Assistive Technology



Transformation Center of Assistive Technology



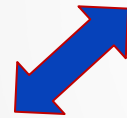
Education base of Assistive Technology



Research & Development Base of Assistive Technology

Research Directions

Rehabilitation Robot &
Intelligent Rehabilitation System



Biomechanics of Human
motion & Intelligent
Perception of Motion



Neural Rehabilitation &
Electrophysiological
Technology



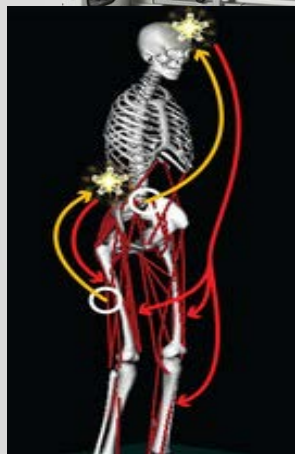
Rehabilitation Robots & Intelligent Rehabilitation Systems

Applied Research

Assistive robot of daily activities for the disabilities

Bionic mechanism & lightweight drive system

Training Robot for patients with nerve injuries



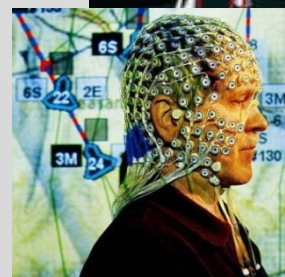
Biomechanics of Human Motion & Intelligent Motion Perception

Applied Basic Research

Human-machine modeling technology

Physical method of multimodal neuro networks of motion feedback

Nonlinear coupled Motion control of biomechanics of human motion



Neurophysiologic Rehabilitation & Electrophysiological Technology

Basic Research

Implanted microelectrodes treatment for central nerve injuries

Mechanisms of neuro rehabilitation

Detecting technology of neuroelectrophysiological signal

23 team members:

- 6 professors
- 8 associate professors
- 8 assistant professors
- 1 lab technician

including

- 2 sponsored by The Thousand Talents Program
- 5 sponsored by Shanghai Pujiang Talents Plan
- 1 sponsored by Rising Star Mentor Program
- 1 granted Shanghai Renowned Teacher Award
- 1 awarded Woman pace-setter

and

- 3 Distinguished Professors (introducing)
- Over 80 postgraduates



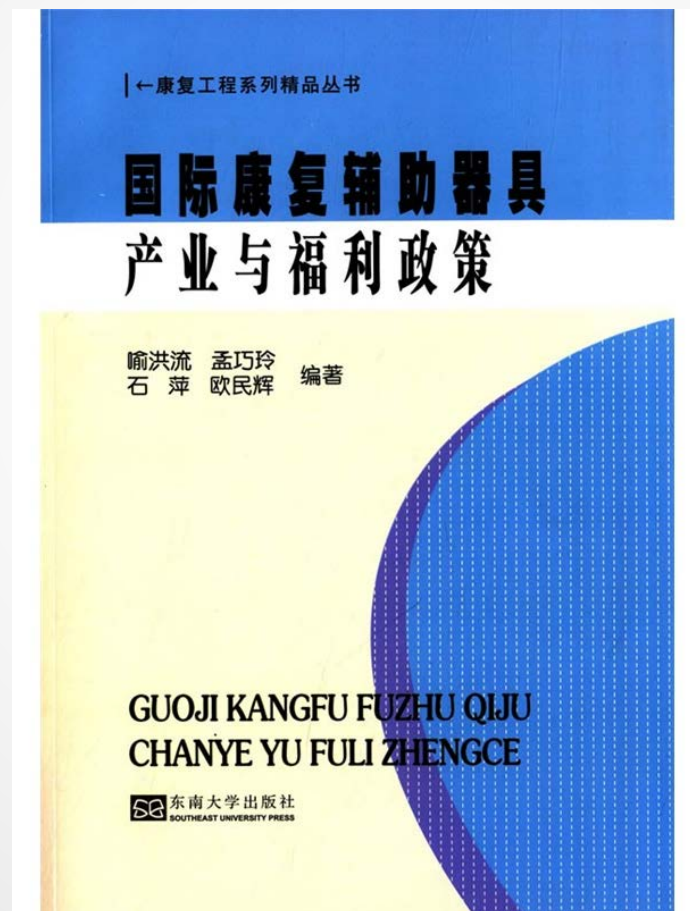
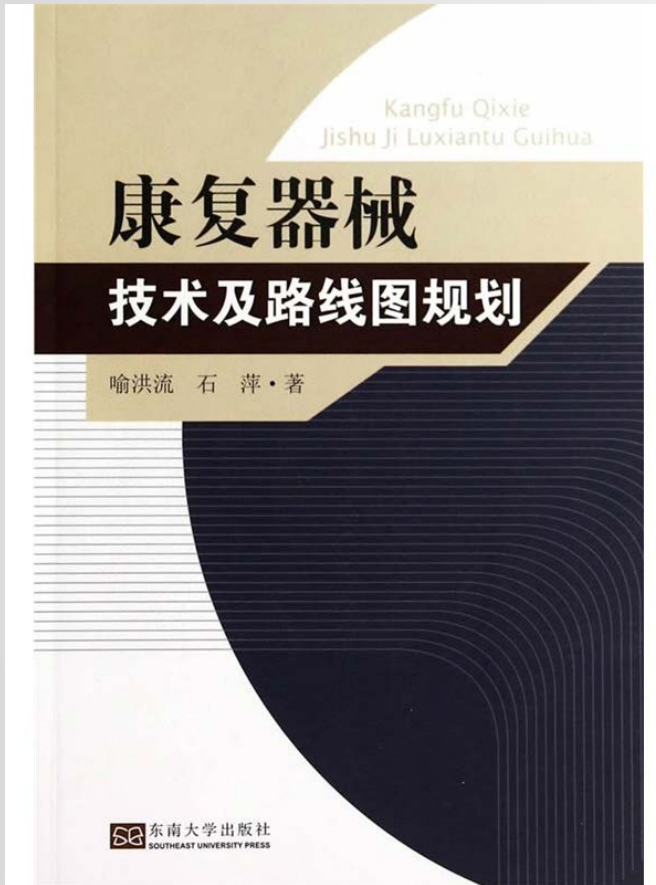
Prof. Hongliu Yu



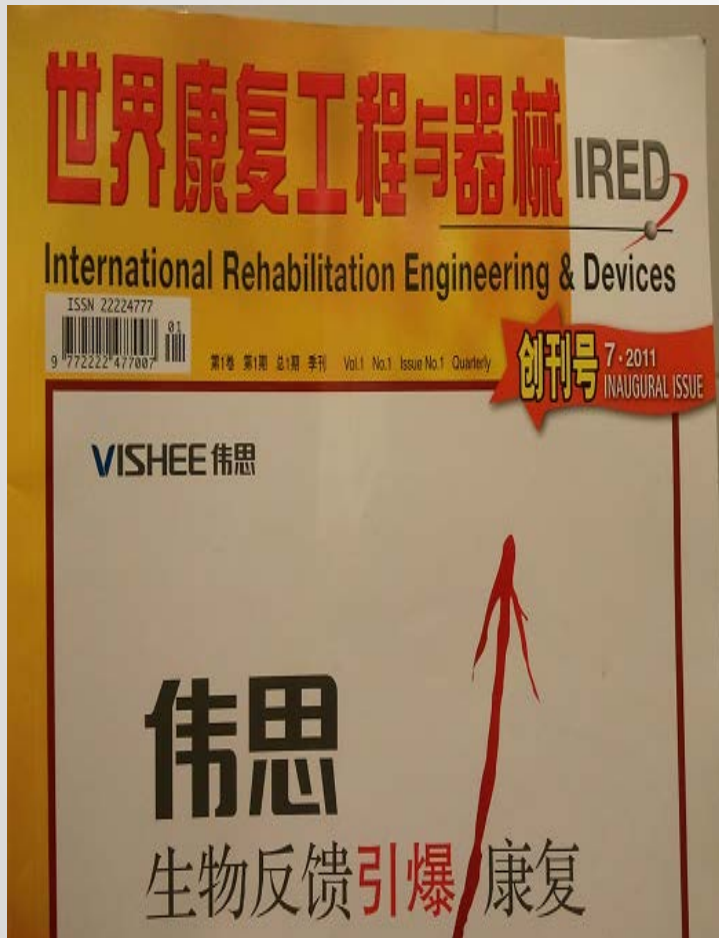
Government Consultancy

- The Ministry of Civil Affairs *Consulting Report for International Development of the Assistive Device Industry*
- Shanghai Committee of Science & Technology *Technology Development Roadmap of Assistive Device in Shanghai*
- Shanghai Robotics Industry Associations *Shanghai Technology Roadmap for Assistive Robot Industry*
- Shanghai Civil Affairs Bureau *Current Status & Development Strategy of Assistive Technology in Shanghai*
- Shanghai Municipal commission of economy & information *A Study of the Development Strategy of Smart Medicine (Aging, Rehabilitation) Industry in Shanghai*

Significant publications in the field of rehabilitation engineering



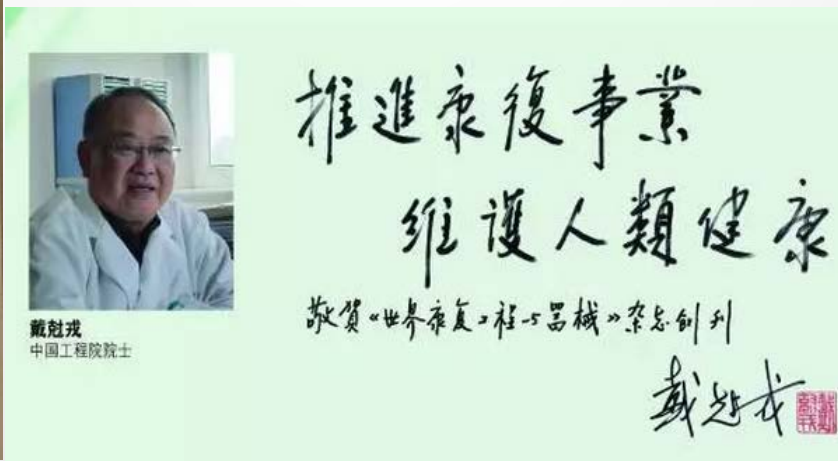
International Rehabilitation Engineering & Devices (The 1st journal in Rehabilitation Engineering in China) was **Founded by Prof. Yu**



The journal made a significant contribution in publishing frontier, reporting industrial events & leading industrial development.

----- Jianan Li

(President of International Society of Physical & Rehabilitation Medicine)



Her Royal Highness Princess Maha Chakri Sirindhorn from kingdom of Thailand visited SERCAD in 2018.



Famous Experts visited SERCAD

美国、德国、瑞士、日本、台湾、香港等50多位国内外康复机器人领域顶级专家、学者参观我中心实验室



National leaders visited SERCAD

- Wangang , Minister of the Ministry of Science and Technology , P.R.C.
- Liu binjie, Director of Committee on education, culture and health of National People 's Congress
- Yan Heping, President of China Association of Assistive Products





中国康复医学会康复技术转化与产业发展座谈会
上海理工大学
2017年9月8日



Organized International Conferences



上海理工大学
UNIVERSITY OF SHANGHAI FOR SCIENCE AND TECHNOLOGY



Shanghai International Symposium on Human-centered Robotics





Organized International Conferences

i-CREATe 2018 & HCR2018

2018国际康复工程与辅助技术大会

2018沪江国际人际共融机器人论坛

July 14-16, Shanghai



i-CREATe 2018&HCR2018 Highlights



- Over **1000** participants to the convention from **18** countries



i-CREATe 2018 Highlight



- 134 teams participated gSIC competition, **45** teams enters into the final round.



Rehabilitation robotics Alliance, Chinese Association of Rehabilitation Medicine

The largest academic organization in the field of rehabilitation robotics in China.
Prof. YU Hongliu is President of alliance.



Found in Aug. 15, 2018

Discipline platforms, key laboratories, research centers, main equipment etc.

	Organizations	Time Established	Note
1	Shanghai Engineering Research Center of Assistive Devices	2015.9	affiliated
2	Key Laboratory of Neural-functional Information & Rehabilitation Engineering of the Ministry of Civil Affairs	2016.10	co-established
2	Rehabilitation device committee, China Association of Assistive Products	2016.7	affiliated
3	Technology transformation & industry promotion committee, Chinese Association of Rehabilitation Medicine	2017.11	affiliated
4	Rehabilitation engineering committee, Shanghai Society of Biomedical Engineering	2016.3	affiliated
5	Rehabilitation robotics committee, Shanghai Electrophysiological & rehabilitation Technology Association	2015.1	affiliated
6	International Convention on Rehabilitation Engineering & Assistive Technology, Asia	2017.8	President

- Broke through key techniques in rehabilitation engineering
- Transferred **over 20 million** of achievements

Lightest Wearable exoskeleton rehabilitation hand in the world, 3rd prize in ICORR2015



✓ Transferred via Danyang Artificial Limb Co. Ltd

The 1st Central-Driven Upper Limb Rehabilitation Robot in the world: Centerobot-Ⅱ



✓ Transferred via Shanghai Jinghe Lim Co. Ltd

Intelligent lower limb Multi-mode balance training system
(Achievement of 863 plan, biggest achievement transformation in the industry in China)



✓ Transferred via Shanghai Xiboy Lim Co. Ltd

Shanghai Engineering Research Center of Assistive Devices was approved in Nov 2017

Undertook over 40 projects (\$ 41.956 million) in the recent 3 years, including 26 government sponsored projects (\$ 15.726 million), 9 cooperative projects (\$ 3.33 million) & 5 self-financed projects (\$ 22.9 million)

- Published **over 120 papers** in SCI/EI journals
- granted **over 80 patents** in the recent 5 years

- ▶ Studies related to neuro rehabilitation were published in **Frontiers in Neurobotics (IF: 2.486)**、**Cell Rep(IF: 8.3)**
- ▶ Studies related to intelligent prosthetics were published in **Automatica (IF 5.451)**、**Journal of Biomechanics (IF: 2.664)**
- ▶ Studies related to neuro rehabilitation & central nerve injuries were published in **Medical & Biological Engineering & Computing (IF: 2.112)** 、 **Neurobiology of Learning & Memory (IF: 3.701)**

- ✓ Intelligent bionic prosthetics
- ✓ Key techniques of intelligent rehabilitation robot
- ✓ Wheelchair-based intelligent multifunctional rehabilitation system
- ✓ EMG signal processing & application
- ✓ Mechanisms of implanted microelectrodes treatment for central nerve injury



Visit by Wan Gang, Minister of Ministry of Science & technology of PRC

- Sponsored **4 provincial projects** in the recent 3 years, among the teams with the most sponsorship

Key techniques of Intelligent dynamic EMG signal controlled prosthetics

3rd Prize, China Machinery Industry & Technology award 2014

Key techniques of high-performance intelligent prosthetic hand

2nd Prize, disability prevention & rehabilitation Science & technology award

Wearable exoskeleton rehabilitation h&

Gold Prize, Challenge Cup of National college student competition award 2014

Intelligent feedback rehabilitation training bed

2nd Prize, University Exhibition, China Industrial Fair 2012

Intelligent lower limb rehabilitation evaluation system

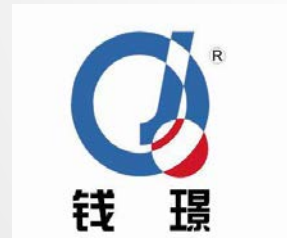
3rd Prize, China Machinery Industry & Technology award 2014

03 **Representative Achievements**

1. Upper Limb Rehabilitation Robot



SERCAD, USST



Changzhou Qianjing Rehabilitation Co., Ltd.



Central-Driven Upper Limb Rehabilitation Robot: Centerobot-II

2. Wearable upper limb rehabilitation robot



上海理工大学
UNIVERSITY OF SHANGHAI FOR SCIENCE AND TECHNOLOGY

SERCAD, USST



上海电气
SHANGHAI ELECTRIC

Shanghai Electric



3. Upper limb rehabilitation robot with multiple degree of freedom



SERCAD, USST

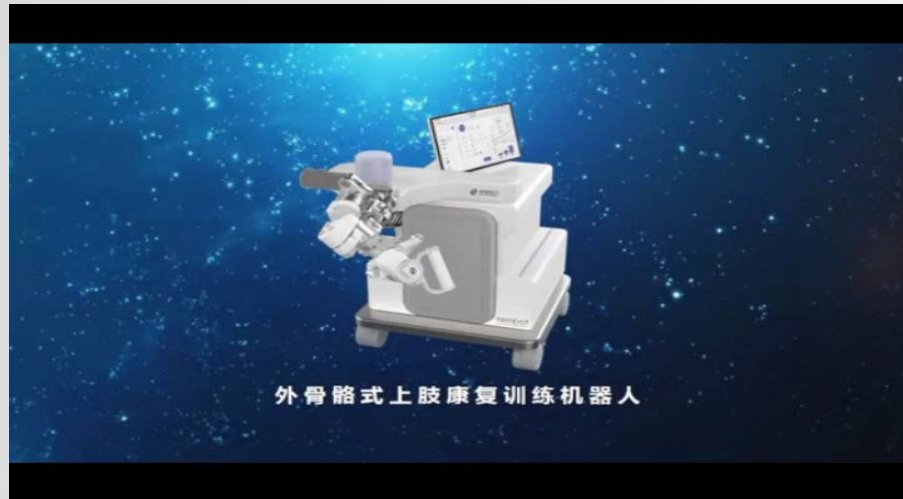


Shanghai Electric

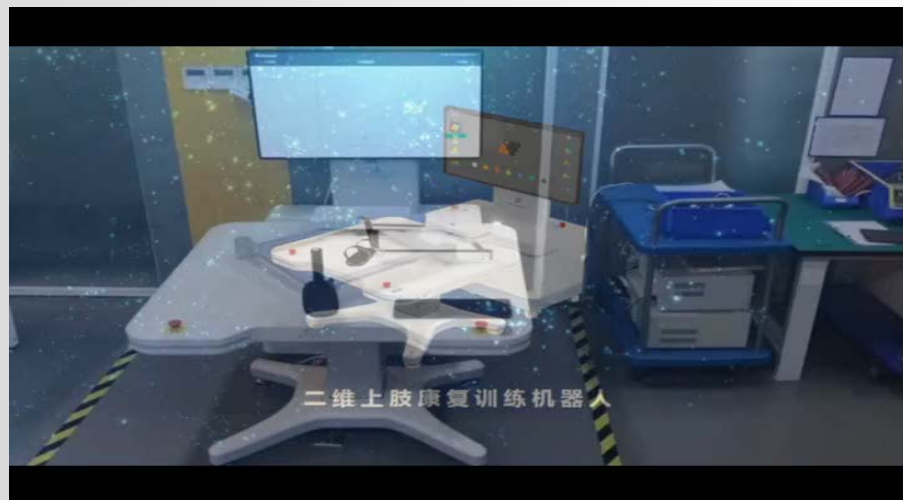
Shanghai Sunshine
Rehabilitation Center



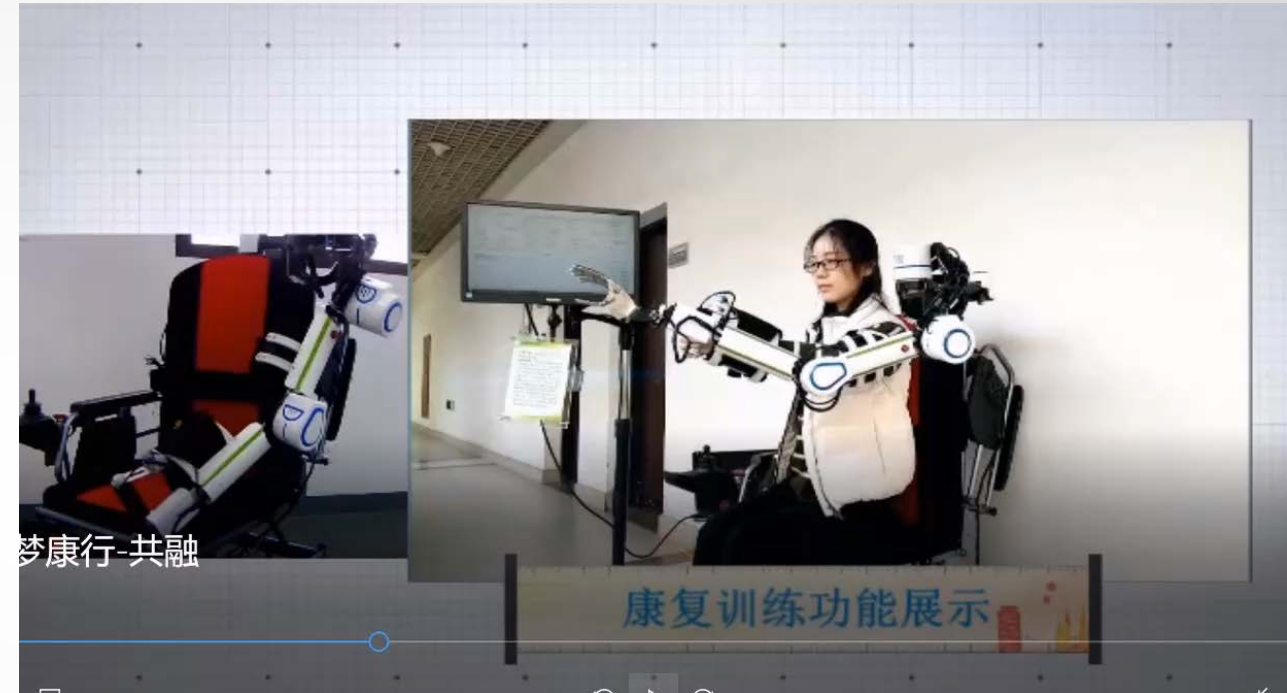
4. Full degree of freedom upper limb rehabilitation robot



6. Desktop upper limb rehabilitation training robot



5. Wheelchair based upper limb rehabilitation robot



上海理工大学
UNIVERSITY OF SHANGHAI FOR SCIENCE AND TECHNOLOGY

USST

Shanghai ZD Medical Technology Co., Ltd

7. Bionic prostheses



上海理工大学

UNIVERSITY OF SHANGHAI FOR SCIENCE AND TECHNOLOGY

USST

Danyang Artificial Limb Co. Ltd



Intelligent upper limb prostheses

8. Wearable & intelligent rehabilitation hand



Wearable exoskeleton rehabilitation hand

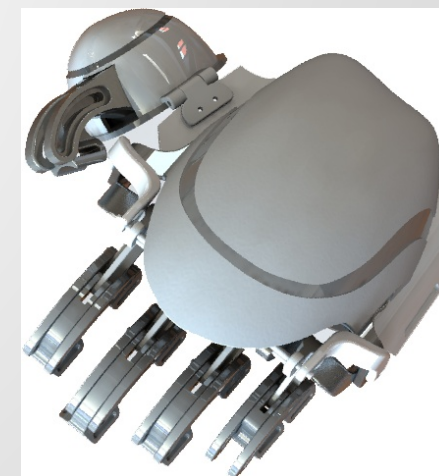


USST

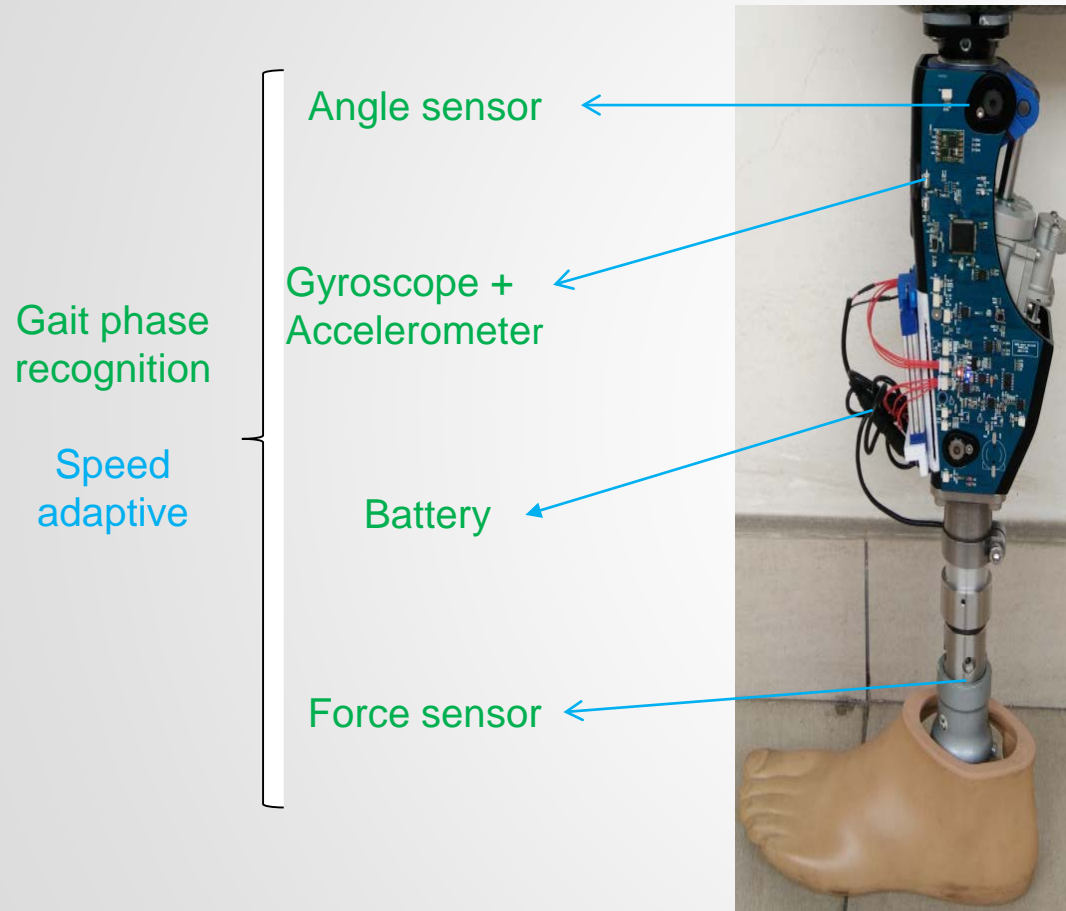


Huashan Hospital

Danyang Artificial Limb Co. Ltd

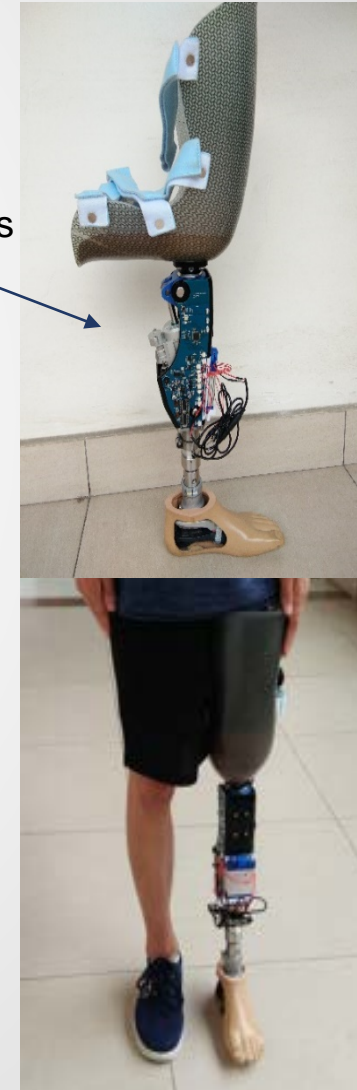


9. Microprocessor-controlled hydraulic bionic Prosthetic knee joint



Produced by Beijing Oriental Re-Sun Prosthetics & Orthotics Technology Development Co. Ltd

Hydraulic damper
(Damping adjustment continuously & independently)



The 1st Microprocessor-controlled hydraulic knee joint in China

The key technique & application of Microprocessor-controlled hydraulic Prosthetic knee joint

10. Intelligent lower limb Multi-mode balance training /evaluation system



USST



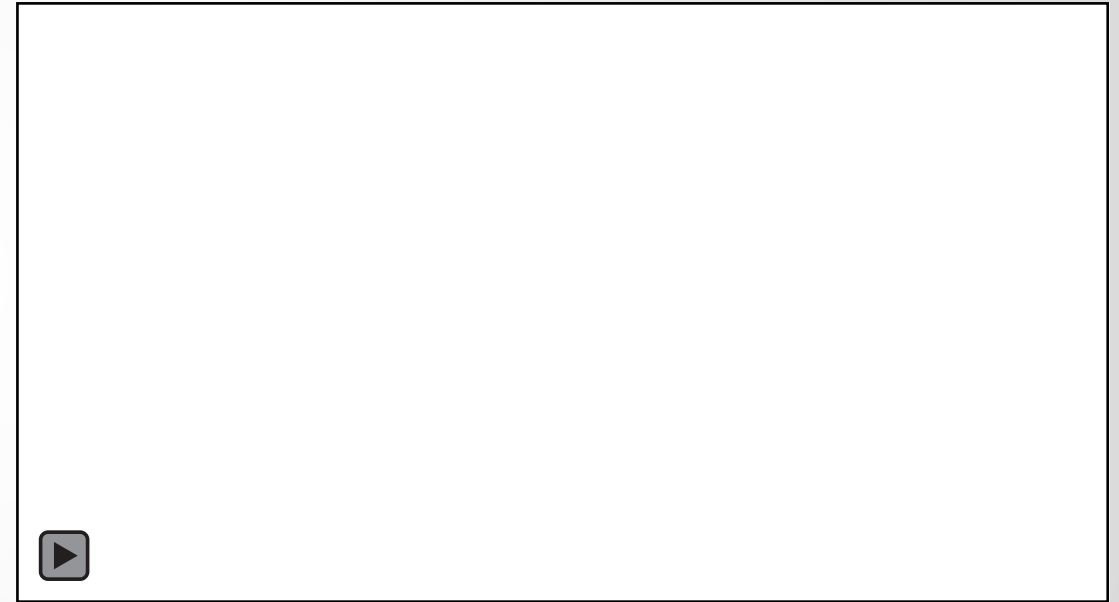
Shanghai Xiboy Lim Co. Ltd



Huashan Hospital



11. Multi-functional rehabilitation electric wheelchair



12. Re-chair



语音控制下肢被动训练
Voice control the lower limb passive training



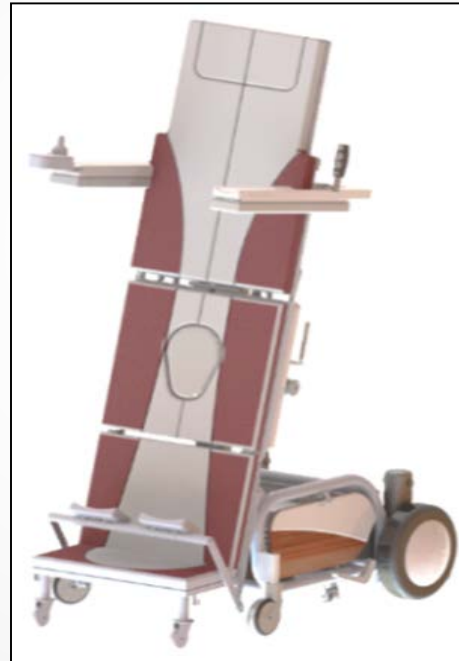
结合了虚拟现实的下肢平衡训练
Combined with the virtual reality of the lower limb balance training



下斜坡
Down the slope



13. Multi-functional wheelchair electric nursing bed



14. Finger rehabilitation trainer



15. Elbow rehabilitation assistive robot

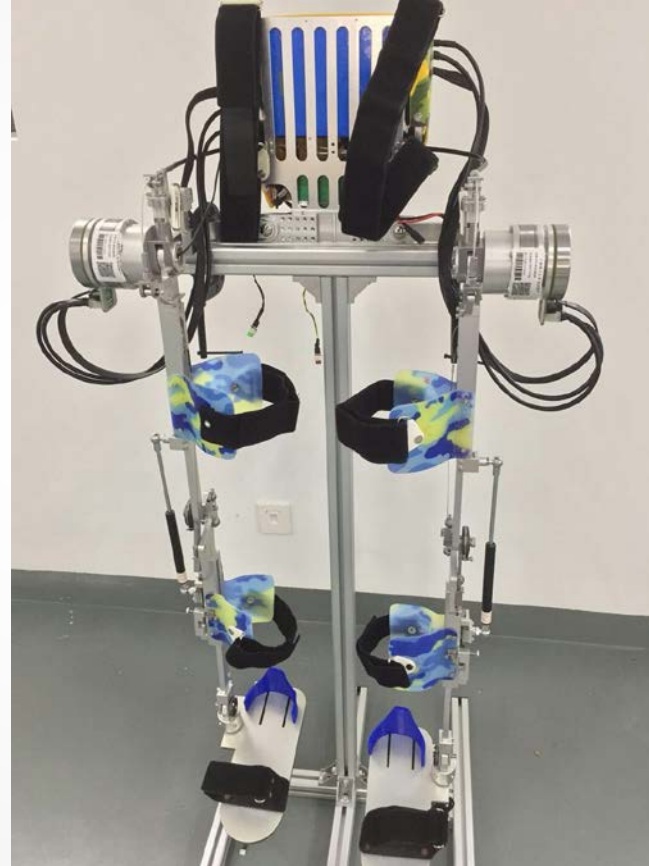


16. Feeding robot



The 1st desktop feeding robot in China

17. Wearable lower limb exoskeleton robot



The 1st lower limb exoskeleton robot with bionic knee joint in the world
The lightest among devices in China



Thank You!