

i-CREATE 2010

international Convention on Rehabilitation Engineering & Assistive Technology

21-24 July 2010
Shanghai Everbright Convention and Exhibition Centre
Shanghai, China

Jointly Organized by:



The Singapore Therapeutic, Assistive & Rehabilitative Technologies (START) Centre



The Thailand's National Electronics and Computer Technology Center (NECTEC)



Shanghai Jiao Tong University



University of Shanghai for Science & Technology

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Shanghai Fenglin International Medical Communication and Development Center



The Hong Kong Polytechnic University
Jockey Club Rehabilitation Engineering Centre and Clinic



西安交通大学
XIAN JIAOTONG UNIVERSITY

Contents

Welcome	1
General Information	2
Session Information	3
Travel Information	4
Conference Floor Plan	7
Conference Organization	8
Exhibition	11
Technical Program Overview	12
Plenary	16
Workshops	20
Student Design Challenge	28
Paper Presentations	33
Authors Index	58

Welcome

Welcome to Shanghai!

China is home to about 85 million people with disabilities (PWD), there's about 20% of the total PWD population in Asia Pacific and easily the highest in the world. As of today, more than 80% of the PWD in China have no access to assistive and rehabilitative devices. Hence, it is of significant importance and timely that the 4th International Convention on Rehabilitation Engineering & Assistive Technology (i-CREATe) comes to China, and in this year, there is no better place than Shanghai – the host city to the World Expo – to host this event.

i-CREATe has achieved notable successes in its previous instalments when it was held in Singapore (2007, 2009) and Thailand (2008). Over the past three years, the event has distinguished itself from other academic conferences by providing contents for all the stakeholders of assistive and rehabilitative technologies, and has won continued support from students, academics, professionals and the governments of Singapore and Thailand.

For i-CREATe 2010 Shanghai, we strive to build on top of this well-received concept to reach out to an even wider audience. For the fourth time, we are greatly honoured by the attendance of Her Royal Highness Princess Maha Chakri Sirindorn, Thailand. We are also elated by the partnership with the International Telecommunication Union (ITU) of the United Nation to organize a workshop on Information and Communication Technology Accessibility. We are also fortunate to have the contributions from authors and experts from over 18 countries and regions. Last but not least, the ever popular Student Design Challenge has attracted a record number of 52 entries from more than 25 institutions of higher learning around the world.

We also hope that you can find time to explore beyond the convention and be charmed by the warm hospitality of Shanghai!



GAO Zhonghua
General Co- Chair



Pairash THAJCHAYAPONG
General Co-Chair

General Information

Convention Date:	21 - 24 July 2010
Convention Venue:	Shanghai Everbright Convention and Exhibition Centre Address: 5F, B Block, 66 Caobao Road, Xuhui district, Shanghai, China, 200235 Tel: 64753288 Fax: 64820944
Registration:	1200hr - 1730hr (21 July 2010) 0800hr - 1730hr (22 – 23 July 2010) 0800hr - 1100hr (24 July 2010) Hotel Lobby, 1 st Level
Plenary Sessions:	Grand Ballroom 2 nd Level
Workshops & Paper Presentations:	Guang Da Room 7, 8, 9, & 11, 2 nd Level
Exhibition:	Presentation Hall, 2 nd Level Open to public. All visitors are to register at the Registration Counter to exchange for visitor passes. 0900 hr to 1730hr (22-23 July 2010) 0900 hr to 1230hr (24 July 2010)
Student Design Challenge:	
- Presentations :	Guang Da Room 10, 2 nd Level
- Prototype exhibition :	Presentation Hall
Gala Dinner:	Grand Ballroom 2 nd Level
i-CREATe 2010 Conference Secretariat	Squall LEE UnionMed, China squall.lee@unionmed.org.cn Ping SHI Shanghai Jiao Tong University, China pshi@sjtu.edu.cn Vera YANG START Centre, Singapore vera_yang@start-centre.com Yuling ZHANG University of Shanghai for Science & Technology, China zhangyuling1982@hotmail.com

Session Information

All Chairpersons and Speakers are requested to be in their respective session rooms at least 10 minutes prior to the commencement of each session.

A total of 15 minutes has been allocated for each oral presentation, including time for questions (12 minutes presentation + 3 minutes question and answer.) Session chairpersons will strictly enforce this limit. Presenters are requested to keep their presentations within the time limits stated.

Presentations must be carried out using **Microsoft PowerPoint**. Neither Overhead projector nor slide projector will be provided.

For presenters using Microsoft PowerPoint, they are encouraged to bring their files in a CD ROM or USB flash drive (thumb drive) and upload their files from **0830hr – 0900hr daily, during the daily tea breaks or lunch time** directly onto the laptop or desktop computer provided in the designated room of the presentation. Presenters may also use their own laptops if their presentations require special software or codec.

About China

THE PEOPLE'S REPUBLIC OF CHINA is the third largest country in the world in terms of area. It is situated in eastern Asia on the western shore of the Pacific Ocean, with an area of 9.6 million square kilometers. China's continental coastline extends for about 18,000 kilometers, and its vast sea surface is studded with more than 5,000 islands, of which Taiwan and Hainan are the largest. China has shared borders for centuries with Korea, the formerly Soviet Union, Afghanistan, Pakistan, India, Nepal, Sikkim, Bhutan, Burma, Laos and Vietnam.

About Shanghai

Shanghai, located along the coast of the East China Sea and the southern banks of the mouth of the Yangtze River, is a city under the direct jurisdiction of the Central Government. It is the largest metropolis in China and one of the most historically significant cities. It is a flourishing international metropolis, known worldwide for its highly developed industrial, commercial and financial components. Its has convenient land, air and sea transportation, rich tourist resources, a vast variety of foods and recreational facilities

Its total area is 2,448 square miles, of which the Pudong New Area occupies 202 square miles. It has a population of over 13 million people.

Shanghai is an ideal "shopping paradise." Nanjing Road, known as "China's No.1 Street", the reconstructed Huaihai Road, Jinling Road, East and North Sichuan Road, the Yuyuan Garden shopping and tourist area, the Ever Bright City Commercial Center, Xujiahui Commercial Center, and Zhangyang Road Commercial Center in Pudong are all packed with rows of shops. Shanghai is also a paradise for gourmets. There are over a thousand restaurants serving the famous 16 styles of Chinese food, such as Beijing, Sichuan, Guangdong, Yangzhou, Fujian. There is also French, Russian, Italian, English, German, Japanese, Indian and many other tantalizing types of foreign cuisine, genuine Muslim food and vegetarian food. In Shanghai you have the world at your fingertips.

Population

China is the most populous country in the world, with 1.25909 billion people at the end of 1999, about 22 percent of the world's total. This figure does not include many Chinese in the Hong Kong Special Administrative Region, Taiwan Province and Macao Special Administrative Region. The population density in China is 130 people per sq km. This population, however, is unevenly distributed. Along the densely populated east coast there are more than 400 people per sq km; in the central areas, over 200; and in the sparsely populated plateaus in the west there are less than 10 people per sq km. The population in cities and towns makes up 30.4 percent; and that in rural areas, 69.6 percent. The male population is 50.8 percent; and the female population is 49.2 percent. People 14 years or younger make up 25.7 percent; those from 15 to 64, 67.6 percent; and those 65 or older, 6.7 percent.

Language

Mandarin is commonly used in the modern China. It is one of the five working languages designated by the United Nations. The majority of the 55 other ethnic groups have their own languages. There are also many dialects around the country. As a written language, Chinese has been used for 6,000 years.

Family Names

Chinese family names came into being some 5,000 years ago. There are more than 5,000 family names in China, of which 200 or 300 are popular. The order of Chinese names is family name first. For example, the family name of a person called Li Ming is Li

Transportation

Air

Shanghai is proud of its two large, modern international airports – Hongqiao International Airport and Pudong International Airport. The former is 13 kilometers west of the city downtown and the latter is 30 kilometers away to the east of the city in Pudong Area. At present, most domestic flights start off and land at Hongqiao and most international flights at Pudong. Special Shuttle bus lines are available for both of these two airports. And also there is shuttle bus line goes between those two airports.

Railway

Everyday more than 70 pairs of trains run between Shanghai and other cities of China. There are 3 railway stations in Shanghai now: Shanghai Railway Station (also known as Shanghai New Railway Station), Shanghai West Railway Station and Shanghai South Railway Station. At present, Shanghai Railway Station is responsible for most of Shanghai's railway transportation, and Shanghai South Railway Station is playing a more and more important role, especially those transportation to the neighborhood Zhejiang Province.

Metro

At present, there are 8 metro lines have come into use in Shanghai, and another more than 5 lines are still under construction. The metro network system can almost send you to all those main tourist attractions and commercial areas.

Taxi

In shanghai, there are about 50,000 taxies, so it is very convenient to take a taxi For the first 3km, the fare is 11RMB. After 3km, it charges 2.1RMB for each km. However, between 11:00pm and 5:00am, the fare is 13RMB before 3km, and 2.6RMB after 3km. If the total trip longer than 10km, an extra fee need be to added (daytime: 3RMB/km, nighttime: 3.9RMB/km)

Climate

Shanghai receives abundant rainfall and the average annual precipitation is over 1000 cm. The "Plum Flower Rain" season (frequent light rain) is from from mid-June to early July with an average daily rainfall of 259 mm. During July and September, strong storms with torrential rain become frequent. However, it seldom snows in Shanghai.

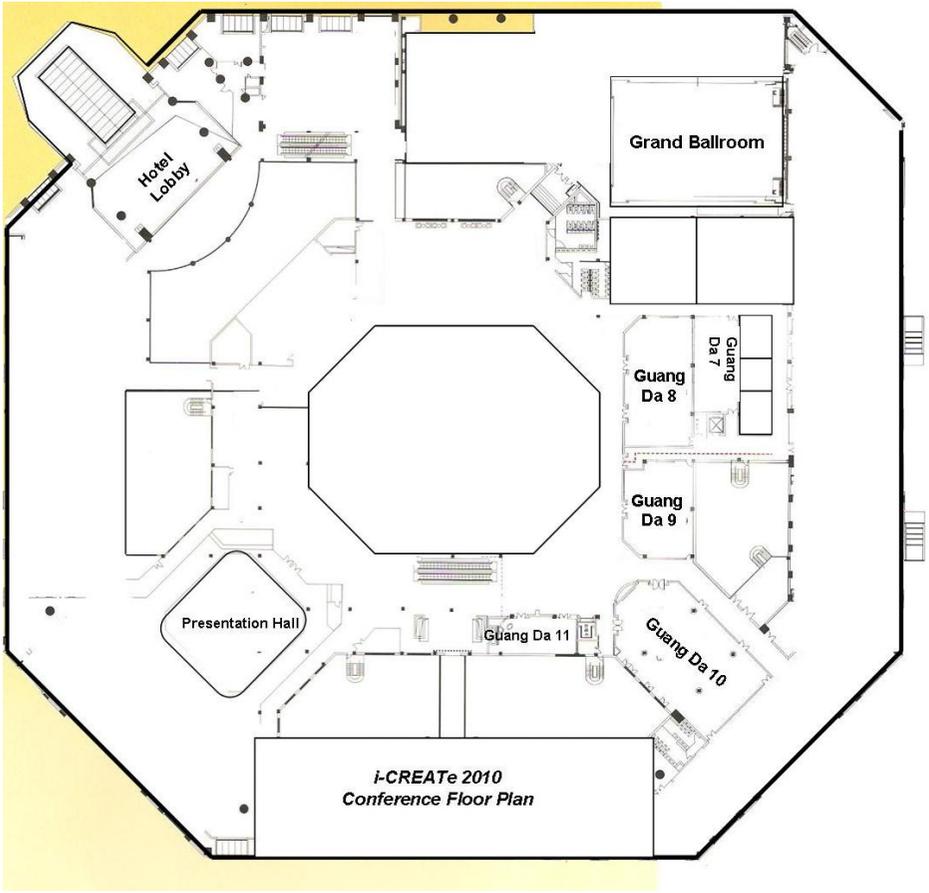
Shanghai summers are hot and humid. July and August are Shanghai's hottest months with average highs of 27.4 degrees centigrade.

In winter, January is the coldest month, with a temperature average of 3 degrees centigrade. All in all, it is best to go prepared with light clothing in summer and warm, heavy clothing in winter. Also, always prepare for rain by keeping an umbrella, but most hotels can equip you with one if needed!

Currency

The official currency in China is the Renminbi (RMB or CNY) or in Chinese "Ren-min-bi". The basic unit is the yuan (also known as "kuai"), which equals 10 jiao (or "mao"), which is then divided into 10 fen. Paper currency comes in 1, 2, 5, 10, 50 and 100 yuan notes. Paper jiao come in denominations of 1, 2, and 5. There are also 1 and 2 fen notes, but these are rarely used as they have no purchasing power. 1 yuan, 1 and 5 jiao, and 1, 2, and 5 fen coins are even common used in larger cities.

Conference Floor plan



Conference Organization

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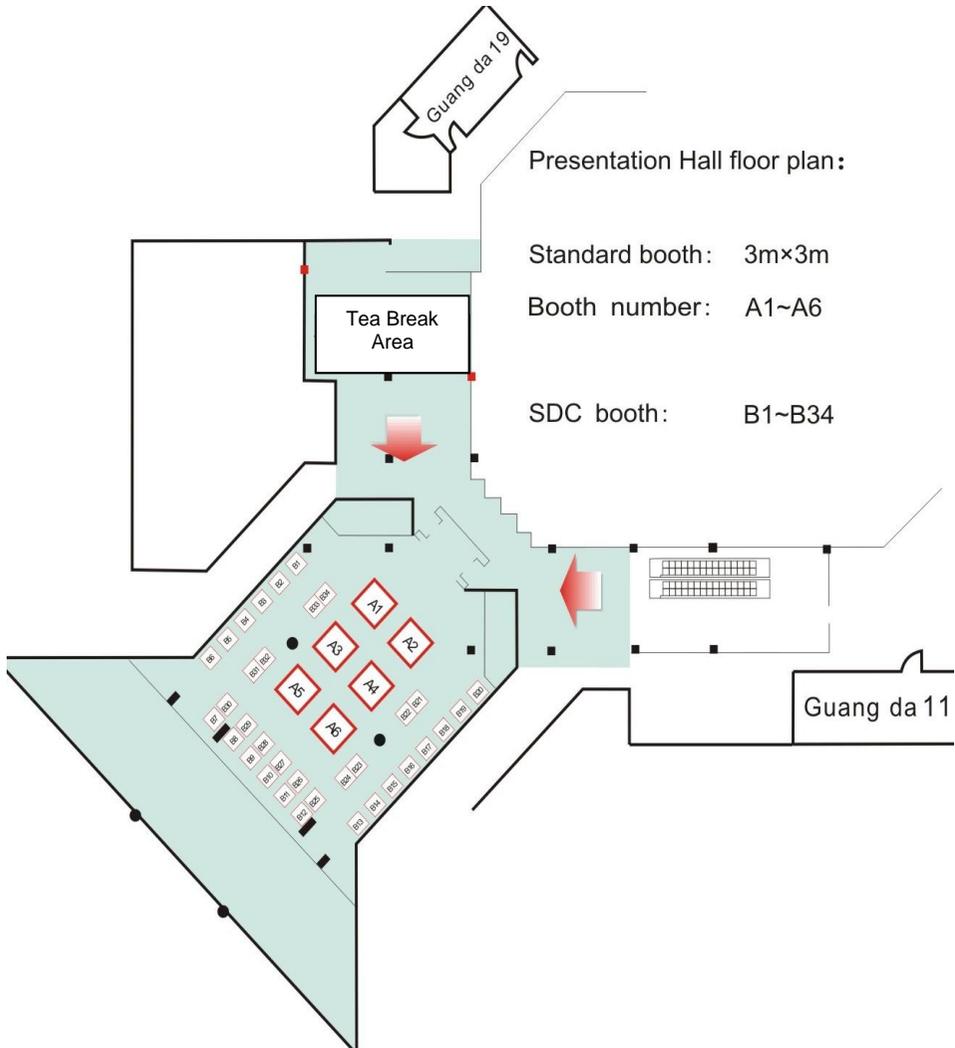
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Exhibition & Students Design Challenge Floor Plan



Technical Program Overview
DAY ONE – 21st July 2010 (Wednesday)

1200 – 1730	Registration (Hotel Lobby)	
	Presentation Hall	Guang Da 10
1300 – 1510	SDC Set-up	SDC Presentations
1510 – 1530	INTERVAL	
1530 – 1730	SDC Set-up	SDC Presentations

Technical Program Overview

DAY TWO – 22nd July 2010 (Thursday)

	Grand Ballroom			
0900 – 0915	Opening Ceremony			
0915 – 0945	Plenary 1 - Prof DAI Kerong (Shanghai Jiao Tong University)			
0945 – 1015	Plenary 2 - Dr Ron KROON (Philips Asian Research Centre)			
1015 – 1045	Plenary 3 - Dr Eun-Ju KIM (International Telecommunication Union)			
1045 – 1115	Plenary 4 - Prof LAN Ning (Shanghai Jiao Tong University)			
1115 – 1245	LUNCH			
	Room Guang Da 7	Room Guang Da 8	Room Guang Da 9	Room Guang Da 11
1245 – 1500	Paper Presentation A1 <i>Augmentative & Alternative Communications (AAC) & Computer Access</i>	Paper Presentation B1 <i>Rehabilitation Technology</i>	Paper Presentation C1 <i>Balancing, Mobility & Seating</i>	Paper Presentation D1 <i>Prosthesis & Orthosis</i>
1500 – 1530	TEA BREAK			
1530 – 1745	Paper Presentation A2 <i>Biomechanics & Biomedical Technology</i>	Paper Presentation B2 <i>Rehabilitation Studies</i>	Paper Presentation C2 <i>Assistive Technology</i>	Paper Presentation D2 <i>Society & Technology</i>
1900 – 2100	GALA DINNER Student Design Challenge Award Presentation Guest of Honor - Princess Her Royal Highness Maha Chakri Sirindhorn (Kingdom of Thailand)			

Technical Program Overview

DAY THREE – 23rd July 2010 (Friday)

	Room GuangDa7	Room GuangDa8	Room GuangDa9	Room GuangDa11
0900 – 1030	Prosthesis Design & Prescription (HK/China)	Information & Communications Technology (ICT) Standards (USA)	Assistive Technology Fundamentals (USA)	Augmentative & Alternative Communications (AAC) for Autism (USA)
1030 – 1100	TEA BREAK			
1100 – 1300	Prosthesis Design & Prescription (HK/China)	ICT Accessibility (ITU)	Assistive Technology Fundamentals (USA)	AAC for Autism (USA)
1300 – 1400	LUNCH			
1400 – 1530	Rehabilitation for Spinal Cord Injury (HK/China)	ICT Accessibility (ITU)	Assistive Technology Fundamentals (USA)	AAC for Aphasia (USA)
1530 – 1600	TEA BREAK			
1600 – 1730	Rehabilitation for Spinal Cord Injury (HK/China)	ICT Accessibility (ITU)	Assistive Technology Fundamentals (USA)	AAC for Aphasia (USA)

Technical Program Overview
DAY FOUR – 24th July 2010 (Saturday)

	Room Guang Da 7	Room Guang Da 9
0900 – 1030	Neuro-Rehabilitation (USA)	AAC with iPhone & iPad (USA)
1030 – 1100	TEA BREAK	
1100 – 1230	Assistive & Rehabilitative Robotics (UK)	Provision of Assistive Technology for PWD in Different Countries (China / Thai / USA / Singapore)
1230	ADJOURN	

DAY TWO – 22nd July 2010 (Thursday)



Prof DAI Kerong

Director
Institute of Rehabilitation Engineering
Shanghai Jiao Tong University, China

Time : 0915hr - 0945hr

Topic: Integrating the Concept of Translational Research into the Construction of Rehabilitation

The development of rehabilitation science depends on the joint efforts of nation, society and rehabilitation specialists. In recent years, worldwide construction of rehabilitation clinical centers and educational bases not only promote of education for rehabilitation specialists and construction of rehabilitation network, but also provide a platform for the multidisciplinary integration, showing great potential of creativity and development, as well as the wide influence.

According to a UN report, 650M people are more or less disabled worldwide, taking 10% of world population with 80% of which distributed in the developing countries, while Asia-pacific region are hosting 400M of them, including 82.96M in China, the most in the world. Besides, the fast expanding disabilities caused by trauma, diseases and new post-operation patients are also adding tremendous demand for rehabilitation. Take the practice of orthopaedics as example, it mainly involves the enhancement, replacement and reconstruction of patients' sensory and mobile function, as well as their abilities of living, work and cognitive psychology. Such demands promote extensive and systemic studies on the mechanism of diseases and injuries, signal transduction and functional fine-tuning and simulation. The research achievement thus are developed into clinical techniques to further improve rehabilitation effect. The cycle from clinical demands to basic research then back to clinical practice can be simplified into B-to-B-to-B (Bedside to Bench to Bedside), i.e. translational medicine or translational research. A typical case is the extracorporeal intelligence systems developed by a combination of multi-disciplinary. With these systems, clinicians can perform two-way information exchange with patients' central or peripheral nervous system. That is so called Neuralinterface Technology, in which the applied technique is FES (Functional Electric Stimulation) and the device is Neural Prosthesis, which have been widely applied in clinical practice and under optimization. Other typical cases include electronic cochlear, myoelectric prosthesis, reconstruction of micturition function in patients of paraplegia and so on.

21st century witnessed the big leap in the development of life science. But the deepening gap between basic and clinical research has hindered some valuable research achievements to be clinically adopted. The concept of two-way or circulating translation improves and

complements the conventional one-way translation pattern, which only emphasizes from basic research to clinical practice. Basic research centered with the clinical demands and difficulties is named as demand-driven research, whose outcome is usually easier to be clinically approved and industrialized, therefore, it is more rapid and effective for the disease prevention as well as the maintenance of human health. Commitment to this translational research concept will be an important guarantee and symbol for the sustaining development of modern rehabilitation centers and educational bases.

A new age of interdisciplinary research is approaching. The joint efforts of multidisciplinary to bridge the basic research and clinical rehabilitation as well as to explore the characteristic translational research development roadmap according with national situations will promote the translation of basic research outcome into the clinical-demanded rehabilitation pattern and technique to benefit the disabled and the society.

Bio sketch

Prof Dai Kerong graduated from Shanghai First Medical School of Medicine and is currently the member of Chinese Academy of Engineering, tenured professor and doctorate supervisor, dean of Ninth Hospital Medical School attached to Shanghai Second Medical University; director of Shanghai Medical Center of Joint Surgery and of the Bone and Joint Research Center; director of Plant Engineering Research Center of Shanghai Jiao Tong University-Shanghai Second Medical University. In 2002, he was appointed as honorary professor of Mediterranean University with the approval of Ministry of Foreign Affairs and Ministry of Public Health of France. Due to his outstanding achievement in the fields of medical application of shape-memory alloy, orthopaedic Biomechanics, bone-Osteoporosis, he has won 21 prizes including Chinese National Invention Prize (Second Prize), National Science and Technology Prize, the first prize granted by National Educational Committee, Shanghai Municipal Scientific and Technological Prize, etc. and has 9 patents. Prof Dai was awarded the first Shanghai Invention Prize, the Outstanding Visiting Scholar to Hong Kong in 1997 and Shanghai medical honorary prize.

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**Dr Ron KROON**

Senior Director  
Head of Healthcare Department  
Philips Research Asia - Shanghai, China

**Time : 0945hr -1015hr**

### ***Topic: Healthcare Innovation at Philips Global Themes- Tailored Approaches to Emerging Markets***

#### ***Abstract***

The presentation will discuss Philips' focus on health and well-being. It will discuss how this translates into the strategy on healthcare innovation, within the framework of Philips' understanding of the future healthcare landscape in the world at large and the emerging

markets in particular. It will address Philips' philosophy of people-focused innovation, aimed to simplify healthcare; how Philips aims to apply its technology to improve healthcare quality and reduce costs. Finally, the Philips healthcare innovation priorities for the Emerging Markets will be discussed, together with examples of innovations from the domain of assistive technologies.

**Bio sketch**

**Dr Ron Kroon** joined Philips in 1993 as a senior scientist with Philips Research in Eindhoven, The Netherlands. There, he worked for several years in the field of information displays and display cathodes. In 1998 he joined Philips Medical Systems, where he worked in the X-Ray imaging field. In his role as Head of Project Management of Business Unit C/V X-Ray, he was responsible for the development and market introduction of X-Ray imaging products for the global Cardio/Vascular hospital market. In 2006 Ron returned to Philips Research, to lead the Healthcare Department in the Philips Research Shanghai, China. His department addresses a range of technologies and applications in the areas of diagnosis and treatment of chronic diseases, focused on the China market. Before joining Philips, Ron received his M.Sc. in Chemistry and PhD in Physics from the University of Amsterdam, The Netherlands. He lives with his wife and two children in Shanghai, China.

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Dr Eun- Ju KIM

Regional Director
International Telecommunication Union
Regional Office for Asia and the Pacific

Time : 1015hr-1045hr

Topic: Information & Communication Technology (ICT) Accessibility, Perspective

Abstract

In view of the Plan of Actions adopted at the World Summit on Information Society (WSIS) and the Convention on the Rights of Persons with Disabilities (PwDs) adopted by the United Nations General Assembly, International Telecommunication Union (ITU) as a UN Specialized Agency for telecommunications/ICT composed of 191 Member States and over 750 Sector Members has not only played a significant role of advocacy to realize inclusive information society but also provided solutions in ICT accessibility for PwDs through setting international standards and developing technologies such as multimedia, 3G/4G and RFID, which enable better communications among, for and with PwDs. ITU experts' groups are currently working in the field of human factors and ergonomics taking into account the growing ageing population in the world. ITU has also been implementing various initiatives and projects with many stakeholders ranging from 'e-Accessibility policy toolkit for PwDs' at global levels to 'Building capacity of harnessing ICTs for disempowered/marginalized communities' at the Asia-Pacific regional level. Having recognized its importance, ITU World Telecommunication Development Conference

(WTDC) has recently adopted a new Resolution on ‘Access to ICT by PwDs, including persons with age-related disabilities’ in Hyderabad, India, June 2010. ITU will further organize events relating to broadcasting and IPTV as well as the framework of the World Standards Cooperation to enhance the role of international standards and accessibility to ICTs. In this broadband and converged digital era, ITU continues to be committed to promote the use of ICTs for PwDs for social-economic impacts to inclusive information society.

Biosketch

Dr Eun-Ju Kim is the Regional Director, International Telecommunication Union based in Bangkok, Thailand, representing ITU and responsible for some 40 Member States in this region. Before she joined the International Telecommunication Union (ITU) – a UN Special Agency for Telecommunications and ICTs – in 2000, she had served several posts such as Director for Regulatory Affairs at the ICO Global Communications based in London (1996-1999), Lecturer for Telecommunication Policies and Regulations at the London City University (1995), and Senior Adviser to Ministers at the Ministry of Communications in the Republic of Korea (1990-1994). Dr Kim graduated from Seoul National University in R.O. Korea for the first Master Degree and the London City University in the United Kingdom for the second Master and Ph. Degrees. She has been awarded by the governments of R.O. Korea and Mongolia with honorary medal as well as the ITU with a gold medal of excellence.



Prof LAN Ning

Professor
Shanghai Jiao Tong University, China

Time : 1045hr-1115hr

Topic: Neuromodulation: bridging the gap between technology and neurorehabilitation.

Bio sketch

Ning Lan obtained his B.S. degree in Precision Instruments from Shanghai Jiao Tong University (SJTU) in 1982; M.S. and Ph.D. degrees in Biomedical Engineering from Case Western Reserve University in 1985 and 1989, respectively. Currently, he is a Professor of Med-X Research Institute; the Executive Associate Director of the Institute of Rehabilitation Engineering at SJTU, Shanghai, China; and Adjunct Associate Professor of University of Southern California, USA. In 1995, he helped organizing the Neural Engineering Committee of the Chinese Society for Neuroscience, and served as its Funding Associate Director. He also served as the Assistant Editor of the IEEE Trans on Rehabilitation Engineering (now IEEE Trans on Neural Systems and Rehabilitation Engineering), and Associate Editor for the China Rehabilitation Theory and Practice. He is a Senior Member of IEEE/EMBS, and a member of Biomedical Engineering Society of USA, Chinese Society of Neuroscience, etc.

His current research includes: (1) neural control of movements: multi-scale, integrative modeling of sensorimotor system and combined experimental approach to neural control of human movements; the roles of spinal circuitry in movement regulation; neural strategies of adaptive learning of brain for motor control; (2) neural rehabilitation engineering: neural interface technology and its applications; functional electrical stimulation (FES) motor prosthesis; control of FES restoration of paralyzed movements in spinal cord injury; hybrid neurorobotics for rehabilitation of hemiplegic stroke patients; (3) cochlear implants: speech processing in cochlear implants for tonal language, such as Chinese.

Workshops

DAY THREE – 23rd July 2010, Friday

W1: Raising expectations and improving outcomes for persons with amputation

0900hr - 1300hr

Room : Guang Da 7



By: **Mr Kam Wa HO**, Senior Prosthetist and Orthotist , StandTALL, Hong Kong

Synopsis

In prescribing a proper prosthesis for a person with amputation, their physical condition, social condition, and person expectation are always taking into account. Physical conditions, such as muscle power, joint range of motion, sensory function, and circulatory function, directly affect the rehabilitation outcome of prosthetic treatment for amputee. For instant, physically well amputees are always expected to have better functional outcome in using prosthesis in daily living, higher flexibility and function ability prosthetic component usually enhance the amputee function. Energy saving, reducing oxygen consumption and increasing stability are only some of the criteria in proper selection of prosthetic component to fit for individual need.

Prosthetic design is also required to meet amputee's social life needs. Special functioned prosthesis can fit for amputee with specific vocational need; thus let them return to their job after rehabilitation. Various types of recreational prostheses increase the quality of life of amputee. Some common sport prosthesis are running prosthesis, swimming prosthesis, hiking prosthesis, and cycling prosthesis. Prosthesis having a more natural cosmetic appearance increase amputee's self-esteem. A comfort and simply don and doff prosthetic socket give amputee more confident in using the prosthesis. In the future, with new technology in prosthetic sciences, advanced component will continue to improve the quality of life of amputee.

W2: Rehabilitation for Spinal Cord Injury

1400hr - 1730hr
Room : Guang Da 7

By: **Mr Kam Wa HO**, Senior Prosthetist and Orthotist, StandTALL, Hong Kong

Synopsis

Spinal cord injury is an insult to the spinal cord resulting in a change, either temporary or permanent, in its normal motor, sensory, or autonomic function. The role of orthotic treatment in spinal cord injury can be divided into acute stage and chronic stage. In acute stage, spinal orthoses are used to immobilize trauma site to prevent further damage. Lower extremity orthotic management in the spinal cord injured patient at this stage is to prevent contractures in the early period after a spinal cord injury. Using conventional AFO and KAFO for foot positioning can maintain range of motion of the lower extremities. This is a prerequisite for future standing and walking training.

In chronic stage, orthoses are prescribed to decrease spinal related pain, to minimize spinal related disability, to assist in return to work and vocational activities, and to improve strength, flexibility, lifting capacity and cardiopulmonary function. Upper limb orthoses and assistive devices maintain upper limb function. Devices are commonly used to achieve various types of gripping and holding for C7 and higher individuals for long-term. Wheelchair, hip-knee-ankle-foot orthosis, reciprocal gait orthosis, knee-ankle-foot orthosis, and ankle-foot orthosis are selected according to the level of spinal cord injury and patient's physical condition to enhance locomotion ability.

W3: An Overview of the Proposed Draft Revised 508 Standards and 255 Guidelines

0900hr - 1030hr
Room: Guang Da 8



By: **Mr Timothy P. CREAGAN**, Senior Accessibility Specialist with the U.S. Access Board, USA

Synopsis

The United States Access Board, as an independent agency of the U.S. government, promotes accessibility for people with disabilities. The Board is updating the standards and guidelines for accessible information and communications technology (ICT) under Section 508 of the Rehabilitation Act and Section 255 of the Telecommunications Act. This session will review the draft proposed revisions and changes. Participants will be able to list at least three significant changes in the proposed text, evaluate the benefits of the approach

emphasizing functionality rather than product categories, and integrate their understanding of the draft revised text into their current understanding of accessibility.

W4: Information & Communication Technology Accessibility

1100hr - 1730hr
Room: Guang Da 8



Dr Eun- Ju KIM
Regional Director
International Telecommunication Union
Regional Office for Asia and the Pacific

By: International Telecommunication Union (ITU)

ITU's role as creator of the world's most universally-recognized infocommunications standards dates back as far as the organization itself. Since its inception in 1865, the Union has been brokering industry consensus on the technologies and services that form the backbone of the world's largest, most interconnected man-made system. In 2007 alone, ITU's Telecommunication Standardization Sector (ITU-T) produced over 160 new and revised standards (ITU-T Recommendations), covering everything from core network functionality and broadband to next-generation services like IPTV.

Synopsis

The workshop will discuss current trends for accessibility to ICTs, with a focus on the ITU-T's standardization work in the field. An overview of the United Nations Convention of the Rights of Persons with Disabilities (CRDP) and its impact on the ITU work will be presented, along with some case studies implemented in the Asia-Pacific region. The ITU event will be offering an excellent occasion of discussion for experts and other interested parties, to address current and future development in the area of accessibility to ICTs. This event is expected to attract technical organizations, representatives from the assistive technology industry, researchers and representatives from the academic world, governments, the civil society and NGOs. Participation by persons with disabilities is strongly encouraged in order that their needs can be heard

W5: Assistive Technology Fundamentals

0900hr - 1730hr

Room: Guang Da 9



By: **Dr Dan DING**, Assistant Professor, University of Pittsburgh Department of Rehabilitation Science and Technology (RST), USA



By: **Mr Ronny THAM**, Senior Manager of Singapore Polytechnic Centre for Applications in Rehabilitation (SP CARE), Singapore Polytechnic, Singapore

Synopsis

This workshop is designed to cover the basic principles for assistive technology (AT) application including needs identification, characteristics of technologies (for mobility and seating, computer access, environment control, and recreation etc.) available to meet client needs, AT service delivery process, and evidence-based practice in AT provision. Throughout the workshop, case studies will be used to illustrate applications of principles and theories in assistive technology provision. Attendees will also be divided into groups to work on a case project where they will be asked to complete AT assessments and present recommended AT solutions.

W6: Children with Autism and AAC Evidence-Based Practice

0900hr - 1300hr

Room: Guang Da 11



By: **Prof Katya HILL**, Associate Professor, University of Pittsburgh Department of Communication Science and Disorders, USA

Synopsis

Children with Autism Spectrum Disorder (AS) frequently present with complex communication challenges and would benefit from applying augmentative and alternative communication (AAC) interventions. This workshop will provide an overview of how to apply the principles of evidence-based practice (EBP) to build language competence with children with autism. The workshop focuses on monitor children through language milestone using manual communication boards and voice-output technology in order to use language to learn. Language Activity Monitoring (LAM) intervention requires using external, clinical, and personal evidence to: 1) guide vocabulary and symbol selection and organization; 2) build spontaneous, novel utterance generation (SNUG) beyond one word responses; 3) empower children with the ability to communicate successfully.

W7: AAC Evidence-Based Practice and Adults with Aphasia

1400hr - 1730hr

Room: Guang Da 11

By: **Prof Katya HILL**, Associate Professor, University of Pittsburgh Department of Communication Science and Disorders, USA

Synopsis

Aphasia is an acquired language disorder that includes difficulty in comprehending and formulating spoken or written language. As a result of a stroke, individuals may present with a wide range of severity or types communication and cognitive disabilities. This workshop reviews how augmentative and alternative communication (AAC) interventions may be used to 1) help with the diagnosis of the acquired communication disorder; 2) support interventions to regain communication skills; 3) provide functional communication during treatment and beyond if necessary. External, clinical and personal evidence used to apply the principles of evidence-based practice with this clinical population will be presented. Finally, how to match individuals to a range of AAC technology interventions will be discussed.

DAY FOUR- 24th July 2010, Saturday

W8: Robotic Neuromuscular Rehabilitation with Outcome Evaluation

0900hr - 1030hr

Room : Guang Da 7



By: **Dr Li-Qun ZHANG, Ph.D.**, Senior Research Scientist SMPP,
Rehabilitation Institute of Chicago, Northern University USA

Synopsis

Spasticity, contracture, muscle weakness and motor impairment are major sources of disability and interrelated in neurological disorders such as stroke and cerebral palsy. There is a lack of effective and convenient ways to conduct controlled passive and active movement training repeatedly with quantitative outcome evaluations. This workshop will present a novel rehabilitation approach of combined passive stretching under intelligent control and active movement training through motivating motor-control game-playing. A novel portable rehabilitation robot has been developed to address the rehabilitation needs, which is suitable for clinic/home settings and useful in improving joint biomechanical properties, motor control, and functional performance.

W9: AAC Applications for iPhone and iPad: Customization and Case Study

0900hr-1030hr

Room: Guang Da 9

By: **University of Minnesota Duluth, USA**



Prof Mark MIZUKO
Speech Language Pathologist
Professor & Chair of Communication
Sciences and Disorders



Prof Jiyeon YOON
Associate Professor
Department of Education



Ms Jolene Hyppa MARTIN
Speech Language Pathologist and Instructor



Mr Teagwan KIM
Information Technology Specialist



Ms Brittany KUCKO
BAS, is a second year graduate student



Ms Meghan KUZNIA
BAS, is a second year graduate student

Synopsis

Augmentative and Alternative Communication (AAC) applications for the iPhone, iPod Touch and iPad have revolutionized AAC by decreasing device cost and social stigma, while increasing portability and worldwide accessibility. This session will feature demonstrations of several AAC applications that can be used on the iPod Touch family of products. A case study investigating the use of this type of device to support language and social skills in an English-speaking child with Autism will be presented in an interactive format and clinical outcomes will be shared. Live demonstrations and video clips will highlight methods for customizing these AAC applications for use by speakers of Korean and other languages.

W10: Assistive and Rehabilitative Robotics

1100hr - 1300hr
Room: Guang Da 7



By: **Prof Etienne BURDET**, Reader of Human Robotics, Department of Bioengineering, Imperial College London, United Kingdom

Synopsis

This half day workshop introduces the state of the art robotics research in rehabilitation and assistive applications. The content is designed for robotics technology researchers, healthcare professionals, end users, and anyone interested in the field.

W11: Provision for Assistive Technology for People with Disabilities (PWDs) in Different Countries

1100hr-1300hr
Room : Guang Da 9



Ms Wantanee PHANTACHAT
Director
Assistive Technology Program, NECTEC,
Thailand



Prof Wei Tech ANG
Assistant Professor
Nanyang Technological University,
Singapore



Prof Mark MIZUKO
Speech Language Pathologist
Professor & Chair of Communication
Sciences and Disorders
University of Minnesota Duluth, USA



Ms Jolene Hyppa MARTIN
Speech Language Pathologist and Instructor
University of Minnesota Duluth, USA



Prof WU Yi
Professor
Fudan University
Hua Shan Hospital, China

Synopsis

In this session, speakers from four countries (China, Thailand, USA and Singapore) who are in this field will share with all the provision for Assistive Technology for PWDs in their countries. They will discuss the important issues faced by the community in their countries and also the current practices and policies of their countries. The presentation will be followed by a forum where participants will be able to join in the discussion with the speakers.

Student Design Challenge

The Student Design Challenge 2010 targets to give our future generation of engineers a better understanding on disabilities and on how the use of assistive and rehabilitative technologies can help improve the quality of life of persons with disabilities.

The last SDC, with Human Machine Interface as its theme, was one of the highlights for i-CREATe 2009 and has drawn a large number of audience. There were over 25 teams from 12 institutions, from 4 countries who participated in this event.

This year, the Student Design Challenge 2010 will focus on the creative, innovative and systematic application of technologies and engineering methodologies to meet the needs of people with disabilities and help improve their quality of life in areas which include education, rehabilitation, employment, transportation, independent living, and recreation.

Categories are, but not limited to the following:

- | | |
|--|---|
| <input type="checkbox"/> Communication aids | <input type="checkbox"/> Hearing and listening aids |
| <input type="checkbox"/> Computer access aids | <input type="checkbox"/> Recreation and leisure aids |
| <input type="checkbox"/> Daily living aids | <input type="checkbox"/> Prosthetics and orthotics |
| <input type="checkbox"/> Education and learning aids | <input type="checkbox"/> Seating and positioning aids |
| <input type="checkbox"/> Environmental aids | <input type="checkbox"/> Vision and reading aids |

Presentation

All teams are required to do an oral presentation covering the key ideas of the project. The presentations are scheduled from 1330hr-1730hr on 21 July 2010 in Room Guang Da 10. Each presentation is 5 minute.

Poster & Prototype Display

All teams are required to display their posters and prototypes at the Student Design Challenge Exhibition Area, from 22 July 2010, 0900hr to 23 July 2010, 1730hr. At least one team member must be present at their booth during the above session.

Judging

A panel of international judges of different professional backgrounds will be invited to judge on the projects. All judges' score based on the judging criteria will carry equal weight and decision of the winners need not be unanimous. The panel will judge the project during the presentation session, followed by a tour to visit and assess the prototype.

Awards

- Champion – USD 1,400.00 and certificate for all members.
- Runner-up – USD 700.00 and certificate for all members.
- 2nd Runner-up – USD 350.00 and certificate for all members.

- Merit Award(s)
The award(s) will be decided by the panel of judges based on the projects that are outstanding but fall short of the top three. The judges may award up to three merit awards.

- Peer's Choice Award
The award is to be decided by the SDC participants. Each team is allowed to cast one vote on the most deserving team entry but cannot vote for itself

- Delegate's Choice Award
The award is to be decided by the conference delegates' visiting the exhibition. Each delegate is allowed to cast one vote on the most deserving team entry.

- Best Presentation Award
The award will be decided by the panel of judges based on the presentation skill of the teams. Language ability is not one of the judging criteria.

- Best Poster Award
The award will be decided by the panel of judges based on the design of the poster displayed at the exhibition area.

- Best Prototype Award
The award will be decided by the panel of judges based on the design and implementation of the prototype displayed.

The top three teams will be invited to the Gala Dinner. The invitation will be made by the organizer at 22 July 2010, 1730hr. The result will be announced at the Gala Dinner.

i-CRETe Student Design Challenge 2010 Entries

SDC-01 An EMG-Based Handwriting Input System

Gan Huang, Shun Chong Li, Xidan Zheng
Shanghai Jiao Tong University, China

SDC-02 Voice Controlled Wheelchair

Hendri, Edwin Leong Kar Ming, Hong Yi Poh, Qi Sheng Tan, Nicholas Liang Zheng Hong
Singapore Polytechnic, Singapore

SDC-03 Incredible 9 Squares

Chayaporn Suphavilai, Nuttapon Surasathien
Kasetsart University, Thailand

SDC-04 Intelligent Navigational Tactile Stick

Yuzhu Bai, Li Niu
North China University of Technology, China

SDC-05 Prometheus- Assistive e-Gadget For Blind People

Jieer Ouyang, Ke Zhao, Shufeng Ren, Tengyang Jing
National University of Singapore, Singapore

SDC-06 An Artificial Neural Robot Based on Multi-Gait Information Monitoring and Feedback Control Technology

Xiuyun Liu, Rui Xu, Shuang Qiu
TianJin University, China

SDC-07 An Automatic Page Flipping System for Disabled Readers

Bass Srongsil, Methichai Obom, Prakaipetch Supakanchankanti
Chiangmai University, Thailand

SDC-08 Batteryless Emergency Safe Alert for Elderly

Xiaoyu Chen, Zhituo Ma
Nanyang Polytechnic, Singapore

SDC-09 Adjustable Interim Shaft of Lower Limb Prosthesis

Bing Li, Bing Shen, Xianwei Du, Yuhang Xing, Fei Liu
Beijing Social Affairs Management College, China

SDC-10 The Intelligent Multi-State Balance Assessment and Training System

Hongmei Wang, Hongyao Zhao, Qiyong Jiang
University of Shanghai for Science & Technology, China

SDC-11 Silent Alarm for the Hearing Impaired

Zaw Htet Thet, Ye Htut Zar Ny, Julio Gonzales
ITE College Central (Yishun), Singapore

SDC-12 Underactuated Prosthetic Hand with EMG Control

Ping Hua Hu, Wei Shao
Shanghai Jiao Tong University, China

SDC-13 Intelligent Assistive Robotic Manipulator for the Elderly and Disabled

Yixiang Sun, Yi Fang
Shanghai Jiao Tong University, China

SDC-14 Universal Voice/Sound Activated Power Strip

Jian Wei Goh, Wei Xiang Lim, Sofri B Abu Samah
ITE College Central (Tampines), Singapore

SDC-15 Environmental awareness enhancing helmet systems for blind

Dan Feng, Shaofan Qi, Shupeng Wang, Ruoyu Ran, Chunliang LV
Beijing Insititude of Technology, China

SDC-16 Intelligent Robotic Wheelchair

Bin Hu, Yong Wang, Zhixuan Wei
Shanghai Jiao Tong University, China

SDC-17 Portable Sit-to-Stand Assistive Device

Sutan Nazarudin Ani, Seng Hau Tai, Jun Yong Lim, Hiap Leong Chua, John Tang Yan Zhang
Singapore Polytechnic, Singapore

SDC-18 Thai – 3D Thai Sign Language Machine Translation System

Natdanai Homkong, Nutnatee Maneerat
Chiangmai University, Thailand

SDC-19 Meal Assistance Robot

Yantao Li, Qi Zhao, YuPeng Zou
Harbin Engineering University, China

SDC-20 Eldercare SMS Alert System

Jiu Soon Loh, Zhi Yuan Lim
ITE College Central (MacPherson), Singapore

SDC-21 Speech Rehabilitation Device for Laryngectomy Patients --Electronic Artificial Larynx

Lifeng Li, Tengyu Zhang
Beihang University, China

SDC-22 Save Our Souls - S.O.S

Soo Wen Chin, Phyu Hpone Mo Khant
Nanyang Polytechnic, Singapore

SDC-23 Adjustable Ankle Foot Orthosis

Zhen Chen, Liying Wang, Liming Rong, Na Zhang
Beijing Social Affairs Management College, China

SDC-24 The Design and Development of Power Added-on for Manual Wheelchair

Bordin Buravatdeacha, Sittichai Prasitphol, Vassapol Phongsuwan
Thammasat University, Thailand

SDC-25 Intelligent Walking Frame

WeiTing Poh, Mei Yang
Temasek Polytechnic, Singapore

SDC-26 Text Book Reader

Zheng Yong Huan, Kan Chen, YaZhuo Xu
North China University of Technology, China

SDC-27 Game Design of Brain-Computer Interface based on Neural Feedback Training

MinPeng Xu, Yue Ren, XiaoPeng Si, MengDie Wang
TianJin University, China

SDC-28 Electronic Elderly Exercise (E3) Apparatus

ZhenWei Liang, Shi Yang, Gerald Chee, Si Yin Lim
ITE College East, Singapore

SDC-29 pTalk

Preechakorn Torrvangwatthana, Thitima Nuchpithak, Panithan Ballungpattama
Sirindhorn International Institute of Technology, Thailand

SDC-30 Prosthetic Upper Limb Based On Speech Control Prosthesis

Zhuo Jan, Long Guan, Dong-jie Ma, Ji-cai Li
University of Shanghai for Science & Technology, China

SDC-31 Key Hole Guide

Wei Chun Tan, Mei Mei Teo
ITE College East, Singapore

SDC-32 Intelligent Walker

Chuntao Leng, Chengcheng Deng, Aolin Tang
Shanghai Jiao Tong University, China

SDC-33 Chair on Wheels

Xuesong Pan, Yu Dai
Shanghai Jiao Tong University, China

SDC-34 A Quasi-Passive Wearable Assistive Leg Exoskeleton for Load Carrying

Yi Qin, Zhengwei Wu
Shanghai Jiao Tong University, China

Paper Presentations

DAY TWO – 22nd July 2010, Thursday

A1

Augmentative and Alternative Communication & Computer Access

Guang Da 7

<p>1245hr – 1300hr</p> <p>A1-1</p>	<p>The Current Situations of Computer Assistive Technology in Learning in Regular Class School in Beijing</p> <p><i>Zhili Liu, Jiacheng Xu</i></p> <p>Special Education College, Beijing Union University, China</p> <p>Based on the surveys of teachers in 42 learning in regular class schools in 11 districts and counties of Beijing, this study learnt that there was a general lack of computer assistive technology devices for students with special needs in learning in regular class schools as a result of a variety of factors such as high price of computer assistive technology devices, lack of funds, few optional devices, unsuitability for students and so on. We will discuss three aspects of problems including funding, advocacy and cooperation, viewpoints.</p>
<p>1300 hr– 1315hr</p> <p>A1-2</p>	<p>An Open-Access Repository of Multimedia Resources to Support Special Needs Instruction</p> <p><i>Lay Wah Lee</i></p> <p>Universiti Sains, Malaysia</p> <p>An open-accessed online repository of multimedia resources named ePKhasSM, has been developed to support special needs instruction. The ePKhas repository can be accessed at http://epkhas.ses.usm.my. There are six types of multimedia resources in ePKhas. The first are Pedagogical Learning Resources Sets © which are complete ready-to-use lesson sets for teachers or parents. These sets consist of a combination of multiple multimedia learning objects anchored semantically to a digital lesson plan. Flash Worksheet Creators are available to enable special education teachers or parents to create customized worksheets for individual learning needs. A picture gallery consisting of graphics reflective of local culture is also available as instructional assets. Interactive multimedia stories suitable for students with disabilities have also been developed.</p>
<p>1315hr – 1330hr</p> <p>A1-3</p>	<p>Information for Everyone using any Phone: Global Development Via Education, Entrepreneurship & Innovation</p> <p><i>Emdad Khan</i></p> <p>InternetSpeech Inc., USA</p> <p>Everyone (including people with aging & disabilities) should have the right to access the Internet so that information can be for everyone. Unfortunately, only a small fraction of population can access the Internet today resulting a large Digital Divide. We argue that existing approaches to bridge the Digital Divide are good but not sufficient to completely bridge the Digital Divide. We then show a more practical solution using .Voice Internet. to provide the benefits of</p>

	<p>the Internet to over 5 billion people (out of the 6.8 billion people in the world) who have some access to a phone. We also show how focusing on education, innovation and entrepreneurship can really help economic, social, cultural and other developments worldwide.</p>
<p>1330hr – 1345hr A1-4</p>	<p>Discussion on Augmentative and Alternative Communication for Adults with Speech Disorder <i>Xuefei Zou, Dongjie Wei, Shengli Li</i> China Rehabilitation Research Center, China</p> <p>Recent years, the application of Augmentative and Alternative Communication (AAC) becomes popular in China. In the meantime, problems arise in application of Mandarin Chinese AAC. In this article, problems in Mandarin Chinese AAC applied to adults with speech disorder will be discussed. The following parts are included: communication capabilities of patients, AAC strategies and the family's attitude to AAC. Two types of speech disorder will be analyzed: adults with aphasia and adults with dysarthria. We also provide some practical examples about Mandarin Chinese AAC used in adults with speech disorder.</p>
<p>1345hr-1400hr A1-5</p>	<p>Perception of Graphic Symbols for Thai Picture-Based Communication System <i>Sarinya Chompoobutr*</i>, <i>Monthika Boriboon*</i>, <i>Wantanee Phantachat*</i>, <i>Puttachart Potibal**</i> *National Electronics and Computer Technology Center, Thailand **Kasetsart University</p> <p>Graphic symbols are a vital part of most augmentative and alternative communication system. Communication fluency of graphic symbol user depends on how well the relationship between symbols and its referents are learnt. The primary aim of this study is to survey the perception of selected graphic symbols across seven age groups of participants with different education. Sixty-five individuals identified themselves as Thai and ranged in age from 10 to 50 years participated in the investigation used sixty-four graphic symbols drawn by Thai prisoners from Central Female Prison, Department of Collections. The results suggest that individuals from different sexes, age groups as well as a variety of educational levels perceive the features or inherent characteristics of such graphic symbols similarly.</p>
<p>1400hr-1415hr A1-6</p>	<p>Analysis of Multi-meaning Graphic Symbols for Thai Picture-Based Communication System <i>Puttachart Potibal*</i>, <i>Wantanee Phantachat**</i> <i>Sarinya Chompoobutr**</i> <i>Monthika Boriboon**</i> *Kasetsart University, Thailand **National Electronics and Computer Technology Center, Thailand</p> <p>Graphic symbols which could convey multiple meanings are available to be considered as the multi-meaning icons. This article aims to demonstrate the analysis of multi-meaning graphic symbols which will be used in the Thai Picture-based Communication System. The 20 graphic symbols with 9-14</p>

	<p>meanings are analyzed in both syntactic and semantic aspects. The meanings are divided into 5 categories: noun, verb/adjective, size, color, and shape. Moreover, the symbol usage or saliency hierarchy of each symbol would be proposed.</p>
<p>1415hr-1430hr A1-7</p>	<p>The Bridge to Literacy. A literacy approach for all students including those who use Augmentative and Alternative Communication. <i>Maureen Casey</i> Liberator Pty Ltd, Australia</p> <p>This paper introduces a reading approach developed for at-risk readers, including students using AAC strategies. The approach emphasizes language-rich experiences, aided language stimulation, and storyboards with AAC symbols. The program follows a constructivist approach to reading development, encouraging children to construct their own language using a core vocabulary of reading words. The approach follows a weekly reading routine, with specific language, reading, and writing activities completed throughout the school week. Details of the approach will be presented during the presentation via videotape with a variety of materials available for review. The approach is being implemented in several primary schools in South Africa.</p>
<p>1430hr-1445hr A1-8</p>	<p>Innovation or Diffusion? Three Scenarios of Vocational Education Settings in ICT Practices for People with Learning Difficulties in China <i>Ying Liu*</i>, <i>Jean Bacon**</i> *British Institute of Technology and e-Commerce, United Kingdom **Cambridge University, United Kingdom</p> <p>We reveal that, despite the high expectations and continuous investment of ICT in education, the technology hasn't been explored and exploited fully to meet the special needs. This is an issue, which we urgently require a more exploratory and cross boundary approach to pursue. One of the biggest problems to people who have disabilities is poverty; most of them still don't have proper jobs. We challenge the diffusion of innovation theories which don't seem to recognise that neither Technology, nor User, nor Market is a global generic domain created outside the education sphere with critical social, political and economic variables.</p>
<p>1445hr-1500hr A1-9</p>	<p>Mandarin Chinese Communication Board---Pixon® <i>Tianxue Yao*</i>, <i>Gail M. Van Tatenhove**</i>, <i>Jutta Herrmann**</i> *Carnegie Mellon University, USA **Semantic Compaction Systems, USA</p> <p>Pixon® manual communication board was created after the first Mandarin Chinese augmentative and alternative communication (AAC) system was developed. It is based on the same design principles and concept, which is the selection and use of high-frequency core vocabulary in spoken Mandarin Chinese, and organized by Part-of-Speech (POS) categories. The board is intended to provide an alternative communication device to children and adults</p>

	with limited and/or emerging language skills and various communication disabilities. The symbol set system of single meaning pictures introduces a group of 150 words. The Pixon® words are selected using three criteria: frequency of use, best practices in AAC, and descriptive talking. It includes various POS and categories. Systematic intervention principles and education materials are also associated and introduced with the modules.
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A2

Biomechanics & Biomedical Technology

Guang Da 7

1530hr-1545hr A2-1	<p>Thermal Therapy with Heartbeat Observation <i>Toru Yazawa*</i>, <i>Yukio Shimoda**</i>, <i>Tatsuyo Suzuki***</i>, <i>Hiroshi Nakata****</i> <i>*Tokyo Metropolitan University, Japan</i> <i>**Tokyo Women’s Medical University, Japan</i> <i>***Okehazama Hospital Fujita Mental Care Center, Japan</i> <i>****NOMS Co. Ltd., Japan</i></p> <p>The size distribution of heartbeat intervals exhibits universal patterns that follow the approximate power law distribution. Using detrended fluctuation analysis (DFA), which can check the power law, we studied the heartbeats of subjects who underwent rehabilitation thermal therapy. We tested whether DFA is potentially useful for evaluating the quality of recovery transition. <i>Method.</i> The EKG recording system that is implemented is our own amplifier that works at a high time resolution (1 ms) with a short time constant (0.22 s). This system enables us to record EKGs without a baseline drift for a long period of time (30~60 min). The long-term stable data were converted to interval time series data in order to use for the DFA. Our own DFA program (by Tanaka) calculated the scaling exponent that determines the degree of wellness of the subjects.</p>
1545hr-1600hr A2-2	<p>Resistance Exercise Combined with Vascular Restriction Improves Endothelial Function and Insulin Resistance in Patients with Type 2 Diabetes Mellitus <i>Chen Wei*</i>, <i>Shang Ning-ning*</i>, <i>Li Juan**</i> <i>*Hebei Normal University of science and technology, China</i> <i>**Yan Shan University, China</i></p> <p>This study examined the effect of resistance exercise, combined with vascular restriction, on endothelial function and insulin resistance in patients with type 2 diabetes mellitus. Twenty-two subjects with type 2 diabetes mellitus were randomly divided into three groups, resistance exercise group (EG, n=7), resistance exercise combined with vascular restriction group (EVG, n=8), and control group (CG, n=7). The resistance exercise was performed three times a week over 16 week period at an intensity of approximately 20% of 1RM for major muscle groups in EG and EVG. And the EVG based on the externally applied vascular restriction pressure of 100 mmHg at the bilateral femoral artery and subclavian artery in exercising.</p>

<p>1600hr-1615hr A2-3</p>	<p>Prediction of Energy Consumption in a Daily Life According to the Intensity of Physical Activity <i>D. W. Kang, J. S. Choi, K. R. Mun, Y. H. Bang, M. S. Kang, G. R. Tack</i> Biomedical Engineering, Konkuk University, Korea</p> <p>The purpose of this study was to predict accurate energy consumption in a daily life according to the intensity of physical activity. To find simple and accurate equation, the following procedures are used; first, the experiment was performed using two accelerometers with attached at the wrist and waist. Second, 13 movements in a daily life with different physical intensities were used during experiment. Twenty healthy subjects were participated and actual energy consumption was measured by a continuous direct gas analyzer. The estimation accuracy with single sensor at the waist was 0.918(correlation coefficient between measured acceleration and measured metabolic equivalents (METs) and that with two sensors at the waist and wrist was 0.921. However, there was not any significant difference between these.</p>
<p>1615hr-1630hr A2-4</p>	<p>Exercise Contribute to Attenuation of Inflammation and Oxidative Stress in Adipose Tissue of IR Rats <i>Hong-tao Yang, Shu-gang Li, Yong-cheng Zheng</i> Hebei Normal University of science and technology, China</p> <p>This study examined the effect of exercise on SOD, MDA and TNF-α of insulin resistance rats' adipose tissue, so that investigate the mechanism of exercise improve insulin resistance. Twenty-three SD rats were randomly divided into 3 groups: control group (CG, n=7), insulin resistance group (IG, n=8) and insulin resistance plus exercise group (IEG, n=8). The model of insulin resistance was induced by high-fat feed; the IEG rats take swimming for 10 weeks. Then SOD, MDA and TNF-α of all rats' adipose tissue were assessed. The levels of MDA and TNF-α were significantly increased in IG rats compared to CG ($P < 0.01$); a significant increase in SOD activity was noted after exercise in IEG compared to IG ($P < 0.05$); in addition, a significant decrease in MDA and TNF-α levels was discovered following exercise in IEG ($P < 0.05$).</p>
<p>1630hr-1645hr A2-5</p>	<p>Research on the Digital Signal Processing of Pulse Wave in Oscillometric method Based Blood Pressure Measurement <i>Yuwen Liu, Ping Cai, Dingding Zhao</i> Shanghai Jiao Tong University, China</p> <p>The processing of pulse wave signal is essential in oscillometric method based blood measurement. A 1st order low pass filter combining with zero-phase filtering is used for the pre-processing of pulse wave signal, with which smooth and monotonous pulse envelop can be obtained, and the accuracy of blood measurement can be enhanced. Experiment results demonstrate the feasibility of the said.</p>

<p>1645hr-1700hr</p> <p>A2-6</p>	<p>Wearable Pulse Oximeter for Health Monitoring based on ZigBee Mesh Network <i>Natthapol Watthanawisuth, Tanom Lomas, Adisorn Tuantranont</i> National Electronic and Computer Technology Center, Thailand</p> <p>In this work, a portable real-time wireless health monitoring system is developed. The system is used for remote monitoring of patients's heart rate and oxygen saturation in blood. The system was designed and implemented using ZigBee wireless technologies. All pulse oximetry data are transferred within a group of wireless personal area network (WPAN) to database computer server. The sensor modules were designed for low power operation with a program that can adjust power management depending on scenarios of power source and current power operation.</p>
<p>1700hr-1715hr</p> <p>A2-7</p>	<p>The Method of Spike Feature Extraction Based on HHT <i>Mingming Zhang, Jue Wang, Tangdong Ao</i> Xi'an Jiaotong University, China</p> <p>It's essential to classify neurons firings to study the dynamic mechanism of neural spikes. Spike feature extraction is a key step in automatic spike sorting. Spikes can't be sorted correctly without proper features. This paper introduces a new method for extracting spike features. This method combines Hilbert-Huang transformation(HHT), which is an adaptive time-frequency analysis technique to acquire the features of spikes. 1334 spikes from 100s recordings can be sorted into three clusters by our method. The number of spikes in each cluster is 355, 650 and 329 respectively. The new method is capable of sorting spikes from different neurons.</p>
<p>1715hr-1730hr</p> <p>A2-8</p>	<p>The Association between Pulse Wave Velocity and Metabolic Syndrome of the Aged <i>Mihee Lee, Jungchae Kim¹ Sun Ha Jee, and Sun Kook Yoo</i> Yonsei University, Korea</p> <p>The present study was conducted to evaluate the influences of age and gender on the results of noninvasive aortic (the common carotid to femoral artery) PWV, arm (the brachial to radial artery) PWV, and leg (the femoral to dorsalis pedis artery) PWV in people with or without component of the metabolic syndrome. We analyzed 765 Korean subjects over 50 years old (470 men, age 56.2±5.8, 295 women, age 57.1±6.1). In particular, aortic PWV and arm PWV levels were not correlated with each other in men. In addition, male subjects who had only mean blood pressure component of the metabolic syndrome showed significantly higher leg PWV values compared to those without.</p>

<p>1730hr-1745hr</p> <p>A2-9</p>	<p>Test of Portable Healthcare Device for Electromagnetic Wave Effects <i>Eun Jeong Cho*</i>, <i>Bo Kyu Kang**</i>, <i>Sun K. Yoo**</i>, <i>Su Kang Park***</i> *Council Ministry of Health & Welfare, Korea *Yonsei University, Korea **Korea Electric Testing Institute, Korea</p> <p>In door, in electromagnetic wave environments, electromagnetic compatibility and analyzing human physical symptoms in using electromagnetic devices were evaluated with sticking detector type's home healthcare ECG equipment among healthcare products. This device measures the deterioration of performances test in the electromagnetic susceptibility test and examines the SAR (Specific Absorption Rate) test through a simulator doing exercise the international and national standards.</p>
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B1

Rehabilitation Technology

Guang Da 8

<p>1245hr – 1300hr</p> <p>B1-1</p>	<p>Mechanism Design of a Novel Two Degree-of-Freedom Ankle Rehabilitation Robot <i>Pengju Sui, Ligang Yao, Zhifeng Lin</i> Fuzhou University, China</p> <p>Ankle rehabilitation robot is commonly used to help people recover from ankle sprain, ligaments stretched, torn or muscle numbness. This paper proposes a novel two degree-of-freedom ankle rehabilitation robot according to the patients' rehabilitation and therapeutic purposes. This device can carry out dorsiflexion/plantarflexion (D/P) and pronation/supination (P/S) movements during the working process. The angle of D/P movement is from -16.7 to 38.7 degrees and the angle of P/S movement is from -29.94 to 19.94 degrees.</p>
<p>1300 hr– 1315hr</p> <p>B1-2</p>	<p>Bilateral Movement Training with Computer Games for Stroke Rehabilitation <i>Marcus King*</i>, <i>Juha Hijmans*</i>, <i>Michael Sampson**</i>, <i>Jessica Satherley***</i>, <i>Nicole McMillan***</i>, <i>Leigh Hale***</i> *Industrial Research Ltd., New Zealand **Burwood Academy of Independent Living, New Zealand ***University of Otago, New Zealand</p> <p>Stroke is the most common cause of complex disability and many patients do not achieve adequate motor recovery of the upper limb with current rehabilitation procedures. Evidence supporting the use of bilateral arm training and virtual reality during stroke rehabilitation has been published. This paper describes two devices developed to use computer games during bilateral arm training. A pilot study of one of the devices showed a mean improvement in the upper limb section of the Fugl Meyer assessment of 4.2 (range 0-10), following a 10 session intervention. Clinician and end-user focus groups determined that the systems were acceptable forms of arm rehabilitation therapies.</p>

<p>1315hr – 1330hr</p> <p>B1-3</p>	<p>A Novel PNF-based Rehabilitation Robot for Upper-limb of Stroke Patients <i>LV Chao*, Le Xie*, Bin Cai**, Jin-wu Wang**</i> *Shanghai Jiao Tong University, China **Shanghai Ninth People’s Hospital, China</p> <p>This paper proposes a novel neuron-rehabilitation robot for upper-limb of post-stroke patients. The robot is driven by a single motor and provides PNF therapy to a patient’s arm that consists of shoulder, elbow and wrist. To begin with, we will provide a brief background on the post-stroke rehabilitation. Following the introduction, we will give a short analysis of the upper limb motor function. Afterwards, a brief review of several different robotic systems is given with special regard to their mechanical structures. In order to meet the needs of unilateral upper extremity diagonal movements originated from PNF approach, we designed a robot to assist the training therapy for the upper-limb.</p>
<p>1330hr – 1345hr</p> <p>B1-4</p>	<p>A Network Structure of FES System for Neurorehabilitation of Patients with Stroke and Spinal Cord Injury <i>Qu He, XY Zhao, P Shi, and N Lan</i> Shanghai Jiao Tong University, China</p> <p>A distributed network structure of Functional Electrical Stimulation (DNS-FES) system is proposed in this paper for rehabilitation applications to patients with stroke and spinal cord injury (SCI). The network structure can be used to control both surface and implanted stimulators. The main components of this networked FES system include a master unit (MU), a distributed stimulation and sensing unit (DSU), a clinical PC, and other sensors for more advanced applications. The command and data transmission between the MU and the DSU was complete through a dual bus to guarantee the real-time control. A prototype of surface FES system is constructed to test the efficacy of the network structure.</p>
<p>1345hr-1400hr</p> <p>B1-5</p>	<p>An Improved Multi-Channel Cortical Recording And Stimulation System <i>Jingyi Bu, Ning Lan</i> Shanghai Jiao Tong University, Shanghai, China</p> <p>Rolston et al. (2009) [1] designed an easy-to-use, modifiable, and inexpensive system for multi-electrode neural recording and closed-loop stimulation. The system can recover rapidly from stimulation artifacts and allow short-latency action potentials (<1 ms post-stimulus) to be detected. This system, however, uses a desktop computer to perform system control and data analysis. Thus, its channel capacity cannot be expanded, and there will be a relatively long delay in closed-loop stimulation due to data flowing in and out of the desktop computer CPU. To improve the performance of the system, we propose to implement a hardware realization for some of its software functions.</p>

<p>1400hr-1415hr</p> <p>B1-6</p>	<p>Rehabilitation Application of A Haptic Device For Upper Limbs Disable <i>Jun Jiang*</i>, <i>Le Xie*</i>, □, <i>Guojie Li**</i>, <i>Bo Wu*</i>, <i>Ping Cai*</i>, <i>Bin Cai***</i> <i>*Shanghai Jiao Tong University, China</i> <i>**Shanghai Institute of Space Propulsion, China</i> <i>*** Shanghai Ninth People's Hospital, China</i></p> <p>Interest in the devices for rehabilitation applications have been increasing. And the devices before have proved that they might assist in and quantify the rehabilitation for upper limbs disable caused by stroke. This paper is to introduce rehabilitation application of a haptic device based on virtual reality technology, which is compact, portable and modular. The focus here is a device with force feedback designed to provide five degrees of freedom, which are rotation, opposition, translation, pitch and yaw. With five degrees of freedom above, the device can help individuals with arm weakness do their exercise and make patients achieve favorable rehabilitation efficacy during their upper limbs rehabilitation.</p>
<p>1415hr-1430hr</p> <p>B1-7</p>	<p>User-tracking Mobile Floor Projection Virtual Reality Game System for Paediatric Gait & Dynamic Balance Training <i>K.H. Leo, B.Y. Tan</i> Singapore Polytechnic, Singapore</p> <p>In this project, an innovative integration of optical infra-red motion capture system, ultra-short throw projector, belt driven linear motor and game programming is proposed to create a novel interactive mobile floor projection game system for paediatric gait and balance training. The proposed system allows children to undergo gait and balance training on normal static surface while playing interactive games incorporated in a virtual environment projected on the floor. The innovative integration of 3D position tracking and programmable motor controller allows our system to cover a walking distance of more than 7 metres. Interactive games were developed based on consultation with paediatric therapists from Singapore KK Women's and Children's Hospital. This system is targeted to retain attention and increase motivation of children undergoing gait and balance rehabilitation.</p>
<p>1430hr-1445hr</p> <p>B1-8</p>	<p>A Phenomenological Model for Electrical Stimulation of the Upper Limb <i>H.G. Tan*</i>, <i>K.K. Ang*</i>, <i>C.T. Guan*</i>, <i>C.Y. Shee**</i>, <i>W.T. Ang**</i> <i>*Institute for Infocomm Research, Singapore</i> <i>**Nanyang Technological University, Singapore</i></p> <p>Neuromuscular electrical stimulation (NMES) reanimates the paralyzed limb by using electrical currents to stimulate the motor nerves to produce a muscle contraction. NMES systems that enable a user to perform arbitrary movements conventionally require the user to control the amount of stimulation manually, using residual functions to manipulate input devices such as a joystick. Alternatively, constant stimulation parameters are used to induce full range movements, for example, a full hand grasp/release. This paper presents a model of the biceps and triceps muscles that produce elbow flexion and extension, which are common disabilities afflicting stroke survivors.</p>

<p>1445hr-1500hr</p> <p>B1-9</p>	<p>RST-Based Fuzzy TS Control Strategy for the Power Control of FES Cycling System</p> <p><i>Hongyuan Jiang, Hongrui Ao, Changbo Ma</i></p> <p>Harbin Institute of Technology, China</p> <p>The aim of this work was to develop the control strategy and an engineering method for the FES cycling system to achieve regular periods of mobile FES cycling with paraplegic subjects. The study utilised a fuzzy TS control strategy to adapt the fatigue status of the paralyzed muscles of subject to improve the robustness of the system. We conclude from the simulation results that control strategy based on fuzzy TS control method is a realistic option for the control of FES system to avoid the hard to the fatigue muscles of paraplegic subject. This method is good to deal with the time-dependency of the system model. Future work will involve FES cycling exercise tests to decrease fatigue duration of muscles for SCI subjects.</p>
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B2

Rehabilitation Studies

Guang Da 8

<p>1530hr-1545hr</p> <p>B2-1</p>	<p>Electrical Stimulation of Hip Adductors and Abductors Improves Gait Parameters of Children with Spastic Diplegic Cerebral Palsy-Pilot Study-</p> <p><i>Sami AlAbdulwahab</i></p> <p>King Saud University, Saudi Arabia</p> <p>Electrical stimulation (ES) of the hip adductor and abductor muscle simultaneously during functional walking training has never been reported as a management option to improve gait in spastic diplegic children. Objective: investigate the effects of simultaneous continuous ES of both hip abductors and adductors during walking on gait characteristics in children with spastic diplegic cerebral palsy (CP). Subject: Three groups of children participated in this project study group included three ambulant children with spastic diplegic CP, two control groups of three ambulant children with spastic diplegic CP and three healthy children. Methods: The study group received two different ES management programs.</p>
<p>1545hr-1600hr</p> <p>B2-2</p>	<p>Discussion on Accelerating Peripheral Nerve Regeneration by Percutaneous Electrical Stimulation</p> <p><i>Jin-wu Wang, Min Huang, Guang-shan Liao, Hai-tao Jiang, Qi Li</i></p> <p>Shanghai Jiao Tong University, China</p> <p>AIM: To explore the clinical effect of percutaneous nerve and muscle electrical stimulation on treating peripheral nerve injuries. METHODS: Nineteen patients with peripheral nerve injuries were treated with percutaneous nerve and muscle electrical stimulation, by using TERESA cantata instrument. Rehabilitation of damaged nerve function were observed, electromyogram (EMG) before and after therapy and effect of different courses after therapy were analyzed comparatively.</p>

	<p>RESULTS: The healing rate of the 29 patient with uncompleted nerve injuries , including arm branchy nerve, radial median nerve, ulnar nerve, who had been treated for 1-4 course, was 58.6%(17/29), the effective rate was 86.2%(25/29).</p>
<p>1600hr-1615hr B2-3</p>	<p>An Evaluation Method on Hand Function to Accomplish Specific Tasks <i>Zhang Meng , Pu Fang , Kou Rui , YangYang , Li Deyu, Fan Yubo</i> Beihang University, China</p> <p>Currently evaluation of hand function is mainly based on scales, but it is unattached with objective measurement results and the classification boundary of ability to complete specific tasks is not obvious. This paper presented an evaluation method on hand function to accomplish specific tasks with standard posture, and figured out that the angle of finger joint showed obvious regularity in accomplishing different difficulty levels of specific tasks. Based on the reference standard concluded, we can predict the hand potential ability to complete various tasks in the scales through joint angles measured, finally improving the quantitative level and statistical efficiency of scales.</p>
<p>1615hr-1630hr B2-4</p>	<p>Motor Rehabilitation Training after Stroke using Haptic Handwriting and Games <i>Zhaohong Xu, Hongliu Yu, Shiju Yan</i> University of Shanghai for Science and Technology, China</p> <p>Rehabilitation training is crucial for stroke recovery and has to be performed on a daily basis. In order to motivate the stroke patients to practice motor trainings and improve rehabilitation process, haptic handwriting and Ten Pin Bowling game with Novint Falcon device are proposed as stroke rehabilitation tools. Ten Pin Bowling game is a virtual reality training which is intended to create a simulated environment for the retraining of motor function. Haptic handwriting can improve motor skill, postural stability and control, hand eye coordination of stroke patients. Some haptic applications for stroke rehabilitation trainings have been used to clinical experiments in Chinese hospitals.</p>
<p>1630hr-1645hr B2-5</p>	<p>Effects of Adjustable Wrist Hand Splint on active Range of Motion in post stroke patients <i>Elahe Tutunchi, Mohammad Ali Javanshir, Malahat Akbarfahimi, Mohammad Kamali</i> Rehabilitation School Iran University of Medical sciences, Iran</p> <p>Introduction: following stroke, patients suffer from hand disability. This study was conducted to determine effects of adjustable wrist hand splint on active range of motion in post stroke patients. Materials and methods: this study was done by a clinical trial with 15 patients with stroke (aged 40-65) in occupational clinics of Rofeydeh Rehabilitation Hospital and Faculty of rehabilitation of Iran University of medical sciences. All patients were categorized in two groups of control (8 patients) and experimental (7 patients). Occupational exercises were done for both groups for four weeks and adjustable wrist hand splint were used in only experimental</p>

	<p>group. wrist Range of motion were measured by Goniometry before and 4 weeks after of treatment.</p> <p>Findings: Rate of Range of motion in experimental group increased in paired t-test while there was not any difference in control group. There was a significant difference in Range of motion of two groups with independent t-test ($p \leq 0.05$).</p> <p>Results: Adjustable Wrist hand splint can increase Range of motion of Wrist.</p>
<p>1645hr-1700hr</p> <p>B2-6</p>	<p>Robotic Assessment of Hand Function with the HapticKnob <i>Olivier Lamercy*</i>, <i>Roger Gassert*</i>, <i>Ludovic Dovat**</i>, <i>Teo Chee Leong**</i> <i>Hong Yun***</i>, <i>Seng Kwee Wee***</i>, <i>Christopher Kuah***</i>, <i>Karen Chua***</i>, <i>Theodore Milner****</i>, and <i>Etienne Burdet*****</i></p> <p>*ETH Zurich, Switzerland, ** National University of Singapore, Singapore ***Tan Tock Seng Hospital Rehabilitation Center, Singapore ****McGill University, Canada *****Imperial College, United Kingdom</p> <p>This paper investigates the assessment of hand function after stroke using the HapticKnob, an end-effector based robotic device to train grasping and forearm pronation/supination. A method to extract meaningful parameters to evaluate hand function from kinematic data recorded by the robot during rehabilitation exercises is presented. Step-wise regression analysis has been performed in an attempt to reconstruct clinical assessment scores from the kinematic data collected during a 6-week rehabilitation therapy with the HapticKnob. Good correlations between clinical and reconstructed scores ($r=0.669$ for Fugl-Meyer Assessment, $r=0.689$ for Motricity Index, $r=0.599$ for Motor Assessment Scale, and $r=0.792$ for Modified Ashworth Scale) illustrate the potential of these objective measures to quantitatively evaluate hand motor function.</p>
<p>1700hr-1715hr</p> <p>B2-7</p>	<p>Effect of Mirrored Observation on a Functional Task: A Pilot Study <i>K. H. Leo*</i>, <i>M. Gossage*</i>, <i>W. T. Ang**</i></p> <p>*Singapore Polytechnic, Singapore ** Nanyang Technological University, Singapore</p> <p>Mirror therapy is a form of observation technique and has been used in stroke rehabilitation. It has been observed to work on patients performing a variety of activities. However, it is not clear which activities are more beneficial to the patients and by how much. Hence, this pilot study attempts to investigate the effect of undergoing a mirrored observation practice (MOP) session consisting of a 5-edged star drawing task. The performance of this task is analysed in terms of 2 elemental components namely (i) star drawing time and (ii) star drawing pattern. Three factors (i) non-dominant hand baseline star draw pattern, (ii) non-dominant baseline stability and (iii) number of tries required to complete MOP stage would be investigated to account for results of the outcome measures</p>

<p>1715hr-1730hr</p> <p>B2-8</p>	<p>Comparison of Robot-Aided Training in the Hemiparetic Upper Limb Between Stroke and Brain Injury</p> <p><i>Sheng Bi*</i>, <i>Linhong Ji**</i></p> <p>*Chinese PLA General Hospital, China ** Tsinghua University, China</p> <p>Primary objective: To investigate the effects of robot-assisted training of the upper limb after stroke or traumatic brain injury (TBI). Research design: This is a baseline, pre-post treatment comparison study. Thirteen subjects with chronic stroke and nine subjects with TBI were enrolled in a program of straight-line and exterior-oriented circular path exercises constrained by a training robot. Subjects trained assisted by the robot according to their motor abilities for 45 minutes 20 times over a period of 4 weeks. Main outcome measures: The Fugl-Meyer test of upper-extremity function, the Motor Status Score (MSS) and the Modified Ashworth scale (MAS) were used to assess their progress 4 weeks before the training, one day before, and one day after the training ended.</p>
<p>1730hr-1745hr</p> <p>B2-9</p>	<p>Studies on Surface Modification of Microelectrode for Deep Brain Stimulation</p> <p><i>Yaxiong Liu, Rukun Du, Zongxu Bai, Ge Qin, Huiyou Wang, Yucheng Ding, Jue Wang</i></p> <p>Xi'an Jiaotong University, China</p> <p>In order to improve the biocompatibility of micro-electrode for Deep brain stimulation (DBS), reduce the immune response of brain tissue and reduce the thick encapsulation layer surround the electrode, a surface modification was held on polyurethane of the DBS electrode head. First modified the electrode surface by N₂/H₂ plasma treatments to achieve the active amino group, and then made polypeptide molecule YIGSR to have a polymerization with the amino group which on the electrode surface. Consequently, the electrode surface had a layer of polypeptide molecule which has a function of promoting the growth of nerve cells.</p>

C1

Balance, Mobility & Seating

Guang Da 9

<p>1245hr – 1300hr</p> <p>C1-1</p>	<p>Development of Low-Cost Wheelchair Cushion for Pressure Sore Prevention</p> <p><i>Sitarsang Sumittra, Saksiri Benjaporn</i></p> <p>Ratchasuda College, Mahidol University , Thailand</p> <p>This study describes the current research in the development and evaluation of low cost cushion for pressure sore prevention with other foam cushions. At each stage, the participants' trials were carried out and evaluated the performance of a low cost cushion (C-01). The C-01 is made from re-bond foam and polyurethane foam. Its durability and pressure-relieving characteristics were compared with the foam cushions. A sample of 10</p>
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	<p>paraplegic persons tested with the three cushions to evaluate the capacity of the cushions to distribute pressure. The modification from C-01 to C-02 was tested with the 30 paraplegic persons by comparing with the three cushions. The results show that the C-02 cushion provided significantly better pressure distribution than the foam cushion.</p>
<p>1300hr–1315hr C1-2</p>	<p>Development of a wheelchair based body weight scale for people with disabilities <i>K. B. Jang *</i>, <i>D. W. Kang**</i>, <i>G. R. Tack**</i> *Rehabilitative & Assistive Technology, National Rehabilitation Center Research Institute, Korea **Biomedical Engineering, Konkuk University, Korea</p> <p>Manual and power wheelchair users have expressed their interests in frequent monitoring of their body weight. However, for the disabled, frequent body weight measurements are not easy since body weight scales designed for home use are usually expensive, and scales for hospital use are available only during hospital visit. Thus the goal of this study is to develop a body weight scale for people with disabilities which is relatively inexpensive, portable, and accurate. Further goal is to develop a wheelchair with body weight scale which is user-friendly and can be applicable to different kinds of wheelchairs.</p>
<p>1315hr – 1330hr C1-3</p>	<p>Body Pressure Measuring Device for the Prevention against pressure sores <i>Y. H. Bang*</i>, <i>D. W. Kang*</i>, <i>J. S. Choi*</i>, <i>K. R. Mun*</i>, <i>G. R. Tack*</i>, <i>K. B. Jang**</i> *Biomedical Engineering, Konkuk University, Korea **Rehabilitative & Assistive Technology, National Rehabilitation Center Research Institute, Korea</p> <p>The disabled on the move using wheelchairs need to have cushions possible to distribute the force being applied to wide ranges to reduce the risk of bedsore. When sitting for a long time continuously without reducing the concentration of pressure, the bedsore will damage tissues of skin and can cause the serious infection which may threaten the life. When sitting in the upright posture, larger proportion of body weight is concentrated on the ischial tuberosity. Therefore, more fundamental prevention from bedsore must be accomplished by providing information on body pressure. Accordingly, it was designed so that it can be supplied to the more disabled through development of the body pressure measuring system which shows the body pressure distribution and the low-price development.</p>
<p>1330hr – 1345hr C1-4</p>	<p>A Design of Training and Evaluating For Balance Function Based on VR Technology <i>Lin Liu, Le Xie, Ping Cai</i> Shanghai Jiao Tong University, China</p> <p>Virtual Reality (VR) technology is of great importance in rehabilitation training and balance function evaluating. This design aims to establish the virtual reality circumstances to build up a balance training and balance function evaluating system. By synchro-sampling the body's motion and location information in real-world and in the computer's virtual circumstances,</p>

	<p>the design helps patients, who suffer from some kind of brain damage after stroke, finish the assigned tasks and games with specific goal, to train them regain the ability of balance to some degree. And this kind of VR environment applied in training method should be a new one with high reliability and high validity especially for the rehabilitation of the patients with hemiplegia or some kind of movement disorders.</p>
<p>1345hr-1400hr C1-5</p>	<p>The Characteristics of Human Standing Balance with Partial Foot Support <i>He Yan, Pu Fang, Wu Fan, Li Shuyu, Li Deyu, Fan Yubo</i> Beihang University, China</p> <p>Cop excursion is usually used to quantify postural stability during standing balance in Clinical and experimental studies. In fact, static stability during upright standing depends on the position of the body center of mass (COM), specifically in relation to the base of support, determines. Therefore, the relationship between COP and COM determines the validity of balance assessment based on COP. Here we employ a method for simultaneous measurement of the COP and COM displacements, and analyze the relationship between COP and COM for double standing with partial foot support base.</p>
<p>1400hr-1415hr C1-6</p>	<p>The structural design of intelligent multi-state balance rehabilitation system <i>Yi Wu*, Fang Li*, Xiu-Lin Xu**, Ren-Ling Zou**</i> *Huashan Hospital, Fudan University, China **University of Shanghai for Science and Technology, China</p> <p>In this study, the structural design of intelligent multi-state balance was built for cerebral palsy, muscular disorder, bone/ joint surgery and other diseases caused by limb movement disorder in patients with rehabilitation training. The main structure of this device was installed by means of virtual assembly. As the pivotal variables, human body comfort, size structure and the key components of stress and strain were analyzed. Kinematics simulation was executed and optimized. The production prototype was made on the basis of the simulation results. Clinical practice showed that the design fulfilled the requirements of the limb movement disorder, weight loss, active training, passive rehabilitation training and other functions.</p>
<p>1415hr-1430hr C1-7</p>	<p>Research on the test-retest reliability of the intellectual multi-state balance measuring and training system <i>Rong-Rong Lu*, Fang Li*, Yi Wu*, Xiu-Lin Xu**</i> *Huashan Hospital, Fudan University, China **University of Shanghai for Science and Technology, China</p> <p>In this study, the test-retest reliability of intelligent multi-state balance measuring and training system was examined. The static balance parameters of 45 healthy adults in 6 different conditions were recorded and analyzed. The test was divided into 2 parts. The second one was carried out 7 days after the first one. The results showed that intelligent multi-state balance measuring and</p>

	training system had a fine intra-class correlation coefficient when testing static balance parameters. It could be used to assess the ability of the static balance in clinical application.
1430hr-1445hr C1-8	<p>Dynamic Interface Pressure with Custom-contoured Cushion during Wheelchair Propulsion <i>Sujiao Li, Jue Wang, Yuchen Guo, Lin Gao, Zhao Long</i> Xi'an Jiaotong University, China</p> <p>Pressure ulcer remains a significant issue in rehabilitation engineering and cushion takes an extra important role in the prevention of pressure sores for the high-risk persons who require wheelchairs for movements. The present study is devoted to the redistribution of interface during different manual wheelchair propulsion. Six subjects were recruited in this research. Dynamic and static interface pressures were investigated with custom contoured cushions for participants, the peak and average pressures and contact area under dynamic conditions were used to compare with static situation. The outcomes showed that interface pressure increased in dynamic conditions comparing with static condition, and the higher speed of wheelchair movement, the greater pressure.</p>

C2

Assistive Technology

Guang Da 9

1530hr-1545hr C2-1	<p>A Study and Application of Speech Recognition Technology in Primary and Secondary School for Deaf/Hard of Hearing Student <i>Zhili Liu, Wanjie Tang , Jiacheng Xu</i> Beijing Union University, China</p> <p>Speech recognition (SR) technology is applied in the deaf/hard of hearing education for its valuable characteristic of speech-to-text. The International Liberated Learning Alliance aims at using IBM Viavoice and Viascribe speech recognition software in teaching and learning to help the handicapped students study more easily, and have had many success in English ect. other language environment. This paper studies the effect of using Chinese speech recognition technology in primary and secondary school for deaf/hard of hearing students, and analyses the influencing factors on applying this technology.</p>
1545hr-1600hr C2-2	<p>Digital Storytelling Book Generator with Customizable Synthetic Voice Styles <i>Atiwong Suchato, Teeraphon Pongkittiphan, Supawat Suntornwanitkit, Natchalai Suesattabongkot, Proadpran Punyabukkana</i> Chulalongkorn University, Thailand</p> <p>Creating a digital talking book (DTB), which is an important knowledge source for the blinds, is usually a time- and effort consuming process. Automatic procedures could be incorporated into a unified system that can generate the books automatically from electronic contents. In this paper, we propose and report on the implementation of a system capable of automatically</p>

	<p>generating DTB with special emphasis on storytelling-styled contents that are usually discouraged by uninteresting natures of voices synthesized from Text-to-speech (TTS) programs. The TTS unit in the proposed system is modified so that authors can style the voice of each speech utterances in DTB packages. A subjective test shows that synthetic conversations based on speech with customized styles are more preferable, natural, intelligible and enjoyable than the traditional ones. The time durations required in generating some sample DTB are also reported.</p>
<p>1600hr-1615hr C2-3</p>	<p>Difficulties in reading small print materials on today's home appliances for people with visual impairment <i>Abbas Riazi, Mei Ying Boon, Stephen J. Dain, Catherin Bridge</i> University of New South Wales, Australia</p> <p>Macular degeneration (MD) is a major cause of visual impairment and blind among elderly people in developed nations. Reading small print size on most domestic appliances is difficult for these people. A study was run where people with MD were interviewed in-depth individually to explore their experiences in regards to their difficulties in performing daily living activities in home environment. Results indicate reading difficulties not only exist in reading books, reading recipes for cooking, newspapers and letters, but are influential in reading small size print on the microwave oven, reading remote control or the television (TV), reading kitchen appliance settings on the dishwasher, as well as difficulty outside of the home.</p>
<p>1615hr-1630hr C2-4</p>	<p>Design and Development of Data-Glove Based on Printed Polymeric Sensors and Zigbee Networks for Human Computer Interface <i>Nattapong Tongrod*, Teerakiat Kerdcharoen*, Adisorn Tuantranont**</i> *Mahidol University, Thailand **National Electronic and Computer Technology Center, Thailand</p> <p>Current trends in human computer interface (HCI) have brought on a wave of new consumer devices that can track the motion of our hands. These devices have enabled more natural interfaces with computer applications. Data gloves are commonly used as input devices, equipped with sensors that detect the movements of hands and communication unit that interfaces those movements with a computer. Unfortunately, the high cost of sensor technology inevitably puts some burden to most general users. In this research, we have proposed a low-cost data glove concept based on printed polymeric sensor to make pressure and bending sensors fabricated by a consumer ink-jet printer. These sensors were realized using a conductive polymer (PEDOT:PSS) thin film printed on glossy photo paper.</p>
<p>1630hr-1645hr C2-5</p>	<p>Design and Evaluation of A Non-verbal Voice-controlled Cursor for Point-and-click Tasks <i>Supadaech Chanjaradwichai, Proadpran Punyabukkana, Atiwong Suchato</i> Chulalongkorn University, Thailand</p> <p>A voice-controlled cursor is an alternative to traditional mouse for users having difficulties in moving fingers, hands, or arms. In this paper, we reported a</p>

	<p>proposed voice-controlled cursor suitable for point-and-click tasks by applying the grid-based concept of accessing locations in a computer display with the use of non-verbal sounds, which are humming sounds with two different pitch values and a short alveolar fricative sound, to select desired grid cell and to perform the mouse click event. It is shown in the experiments that the proposed method can achieve a higher accuracy rate, a shorter response time, and a better user preference than the traditional Mouse Grid that recognizes spoken digits as its main cell selection mechanism.</p>
<p>1645hr-1700hr C2-6</p>	<p>On Engineering and User's Satisfaction of a Pocket Digital Hearing Aid; a Preliminary Report <i>A. Noymai* A. Hemakom* P. Israsena*, S.Isaradisaikul MD** N. Navacharoen MD** S. Boonyanukul ** S. Lekagul MD***</i> *NECTEC, Thailand ** Chiang Mai University, Thailand *** RCOT, Thailand</p> <p>This paper discusses preliminary results on REAT institute's attempt in developing an alternative digital hearing aid targeted for rural usage. Following our previous publication on its design and acoustical performance, this paper reports on its 3-month trial at Chiang Mai University Hospital, both on engineering and user's satisfaction aspects. The patient outcome measurement protocol used is adopted from APHAB, the first time it is implemented in Thai language. Initial results indicate that using the device improves user's satisfaction in terms of ease of communication and aversiveness of sounds. In terms of engineering, the devices under test also proved to be robust, passing all the designated tests.</p>
<p>1700hr-1715hr C2-7</p>	<p>Design and Evaluation of a Kitchen for Persons with Visual Impairments <i>Benjamas Kutintara*, Metinee Srettananurak*, Piyanooch Jedeeyod*, Kittikan Pornpatoom*, Virajada Buasri*, Veraya Iam-cham*, Pornpun Somboon**</i> *King Mongkut's Institute of Technology, Thailand **Ratchasuda College Mahidol University, Thailand</p> <p>Visually impaired people need skills on daily living, such as cooking, and Ratchasuda College offers independent living training for them. In order to fulfill their needs, a suitable kitchen should be designed with the consideration of their limitations. The objective of this study was to design and evaluate a kitchen for persons with visual impairments. Before designing the kitchen, interviews and an observation were carried out to obtain information on the needs of blind and low vision persons. Consequently, a kitchen model was developed, and it was evaluated by 10 persons with visual impairments. After the design improvement, the kitchen was built and has been routinely used for training persons with visual impairments to prepare meals.</p>

<p>1715hr-1730hr C2-8</p>	<p>Home Smart Home: Brain-Computer Interface Control for Real Smart Home Environments <i>Roberta Carabona*</i>, <i>Ferdinando Grossi**</i>, <i>Ilaria de Munari**</i>, <i>Adam Tessadri**</i>, <i>Antonio Caracciolo***</i>, <i>Paolo Castiglioni***</i> <i>*Don Gnocchi Foundation, Italy</i> <i>**University of Parma, Italy</i> <i>***Don Gnocchi Foundation</i></p> <p>Brain-computer interface (BCI) systems enable people to interact with other people and to operate the environment without muscular activation, being useful as assistive technology as well as neurorehabilitation tools. A BCI system exploits brain signal modifications arising from the execution of a cognitive task assigned to the BCI user and the visual P300 seems particularly suited for smart home applications. The aim of the present work is to investigate the feasibility of BCI use in a real smart home environment. Four subjects affected by strong disabilities and with no previous experience with BCI participated in this study. Data were collected using a P300-based BCI system with two different 6x6 speller matrices, filled respectively with alphanumeric characters and with icons. Icons are representations of actions on devices present in the apartment or of user moods/needs.</p>
<p>1730hr-1745hr C2-9</p>	<p>Creating Enriched Environments through a Modular Wall System <i>Dan Ding</i>, <i>Juan Jose Vazquez Lopez</i>, <i>Jeff Giuggio</i>, <i>Vinod Sharma</i>, <i>Younghyun Chung</i>, <i>Rory Cooper</i> University of Pittsburgh, USA</p> <p>The efficacy of environmental enrichment has been noted in promoting neural plasticity and positive functional outcomes of animals with injured and intact brains. In this paper, we describe a novel approach to facilitate the design, development, and assessment of enriched environments for human users with brain disorders or injuries. The modular wall system allows seamless integration of the living environment with a variety of products, services, and applications, and facilitates natural and intuitive interaction between the user and his/her environment. A prototype kiosk utilizing the modular wall concept and example applications are discussed.</p>

D1

Prostheses and Orthoses

Guang Da 11

<p>1245hr – 1300hr D1-1</p>	<p>Design and Application of Gait Analysis System for Prosthesis Wearers <i>Tengyu Zhang</i>, <i>Lifeng Li</i>, <i>Xiaojun Shen</i> National Research Center for Rehabilitation Technical Aids , China</p> <p>Gait analysis is a very important basis for reflecting the states of human movement. In this paper, a 3D motion capture system, an EMG signal collection device and two force plates were used to build up the gait analysis system for prosthesis wearers. And the system was used in the research and debug of the intelligent AK (above-knee) prosthesis. The results of clinical test</p>
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	<p>indicated that: according to the analysis results of this system, appropriate control parameters can be used in the intelligent prosthesis adjusting, thus the amputees can have a better gait.</p>
<p>1300hr–1315hr D1-2</p>	<p>Fusion of Myoelectric and Near-Infrared Signals for prostheses Control <i>Stefan Herrmann, Klaus Buchenrieder</i> Universität der Bundeswehr München, Germany</p> <p>Assistive tools for mobility and manipulation require sophisticated control interfaces, tailored to the capacity of the user while compensating limitations, such as muscle fatigue. The key to control-transparency for the patient, safety and security during operation, and real-time performance of the assistive device are astute sensors. In this contribution we bring forward a novel sensor, in which we combine a myoelectric and a near-infrared sensor, to detect muscle exertions for the real-time control of assistive devices. Since our research of over more than a decade now focuses on the electronic control of prostheses for the upper-extremity, as used by patients with either above- or below elbow amputations, we provide solid examples from this domain.</p>
<p>1315hr – 1330hr D1-3</p>	<p>Usability Analysis of Textile Sensors in Control of Multifunction Myoelectric Prostheses <i>Zhiyong Zhang*, Guanglin Li*, Shoubin Liu**</i> *Shenzhen Institutes of Advanced Technology, China **Harbin institute of technology, China</p> <p>Surface electromyography (EMG) signals in myoelectric control of a motorized prosthesis are recorded commonly using the Ag/AgCl gel electrodes. Although a gelled electrode may provide high-quality EMG recordings, it is inconvenient in clinical application of a myoelectric prosthesis. A novel type of signal sensors, textile electrode, will be ideal for EMG signal recordings in control of a multifunction myoelectric prosthesis. However, it is unknown whether the performance of textile electrodes in control of myoelectric prostheses is comparable to commonly used electrodes. In this study, we used the commercial conductive woven to make textile electrodes for EMG signal recordings and investigated the performance of EMG signals in identifying nine arm and hand movements.</p>
<p>1330hr – 1345hr D1-4</p>	<p>Clinical Study of Phantom Limb Pain by Fitting Prosthesis at Early Stage after Amputation <i>Chun-jing Tao, Li Liu, Xiao-yu Zhang</i> National Research Center for Rehabilitation Technical Aids, China</p> <p>Study the therapeutic effect of phantom limb pain by fitting prosthesis at early stage after amputation. 30 amputees fitted with prosthesis are selected randomly and divided into 5 control group according to the amputation time. VAS pain evaluation method was used to evaluate the phantom limb pain. The phantom limb of amputees who were fitted with prosthesis after 1-3 months of amputation was relieved. The clinical study results showed that fitting prosthesis at early stage after amputation can relieve phantom limb pain effectively.</p>

<p>1345hr-1400hr</p> <p>D1-5</p>	<p>Development of Upper Limb Prosthesis Technology <i>Hong-liu Yu, Pan-pan Li, Jia-hua Hu</i> University of Shanghai for Science and Technology, China</p> <p>As a leading-edge research field of robotics and biomedical engineering, upper limb prosthesis reflects comprehensive application of advanced technology. In this paper, current research and development of upper limb prosthesis in recent years was analyzed, including the control, signal sources, BCI technique, etc. Finally, the further development directions of upper limb prosthesis technology were also discussed.</p>
<p>1400hr-1415hr</p> <p>D1-6</p>	<p>MMG Signal and Its Applications in Prosthesis Control <i>Hong-liu Yu, Sheng-nan Zhao, Jia-hua</i> University of Shanghai for Science and Technology, China</p> <p>Surface mechanomyogram signal (MMG) is a sort of mechanical signal which is measured by transducers when contracting muscles emit low frequency mechanical vibrations on the surface of the skin. Compared to traditional electromyogram (EMG), MMG signal provides significant outstanding properties .The objective of this article was to analyze the performances of MMG signal in its applications. Particularly, as a control signal for externally powered upper limb prosthesis, the advantages and disadvantages of MMG compared with the conventional EMG control were discussed in the paper. This study shows that both of EMG and MMG can provide complementary information about the electrical and mechanical activity of the muscle, but the MMG offers an innovative method for prosthesis control technology from which some patients failing in using EMG control prosthesis can benefit.</p>
<p>1415hr-1430hr</p> <p>D1-7</p>	<p>Total Knee Arthroplasty and Evaluation of Rehabilitation <i>Xianqiang Mi, Fuqing Zhong, Zhaodan Lu</i> University of Shanghai For Science and Technology, China</p> <p>As surgical techniques and biocompatibility of the biomaterials develop, total knee arthroplasty (TKA) has already been a mature medical technology. However, there are still a considerable number of adverse incidents for knee arthroplasty surgeries every year. In addition, TKA should also focus on the preoperative and postoperative rehabilitation in order to obtain a good result. At the same time, the popularity and development of the TKA also promote an urgent need for evaluation criteria that is thorough and reliable for its clinical function.</p>

<p>1430hr-1445hr</p> <p>D1-8</p>	<p>Current Progress of Key Technology of Porous Bone Tissue Scaffold Manufacturing Using Selective Laser Sintering Rapid Prototyping (SLS)</p> <p><i>Yiqing Wang, Qing Zhang, Ying Zhou, Jue Wang, Bingheng Lu</i> Xi'an Jiaotong University, China</p> <p>Selective Laser Sintering rapid prototyping (SLS) technology has broad application prospects which can be used to manufacture porous bone tissue scaffold with high efficiency, customization, etc, the porosity and strength of porous bone tissue scaffold can be controlled in the SLS procedure. This paper describes the key technologies of the porous bone tissue scaffold manufacturing including porous bone scaffold materials preparation and porous bone tissue scaffolds manufactured by SLS. The influencing factors of strength, porosity and accuracy of porous bone tissue scaffolds manufactured by SLS are analyzed. Finally, the latest research progresses of the key technologies of the porous bone tissue scaffold manufactured by SLS are introduced.</p>
<p>1445hr-1500hr</p> <p>D1-9</p>	<p>Orthopedic Education and Training in China</p> <p><i>Hua Long*, Di Xu**</i> *Beijing Management College for Social Affairs, China **Huazhong University of Science and Technology, China</p> <p>The essay draws conclusions on existing educational stratification and training standards, through which the impact of industry normalization on professional education and training manifests itself. The essay also presents countermeasures to promote further education in the field of orthopedic technology in China.</p>

D2

Society & Technology

Guang Da 11

<p>1530hr-1545hr</p> <p>D2-1</p>	<p>Developing an Initial Questionnaire for a Modified-Delphi Study on Mobile Shower Commodes</p> <p><i>Emma L Friesen, Trevor Russell, Deborah Theodoros</i> University of Queensland, Australia</p> <p>Mobile shower commodes (MSCs) are commonly prescribed for adults with spinal cord injury (SCI) to facilitate bowel care and showering. No screening tools currently exist to alert the user or their carers to problems that may require specialist intervention. A modified-Delphi study technique was chosen to develop a screening tool to be known as the Mobile shower commode Assessment Screening Tool (MAST). In the initial questionnaire development phase, a total of 50 elements were identified through content analysis of relevant literature. These elements were sorted into three broad categories: clinical/medical, functional / occupational health and safety and maintenance. Descriptors for a 5-point Likert scale were added along with an option of "Not applicable".</p>
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<p>1545hr-1600hr</p> <p>D2-2</p>	<p>Teleaudiometry; A Work Toward Accessible Hearing Screening in Rural Areas <i>A. Hemakom, N. Tuangpermsub, A. Noymai, P. Israsena</i> National Electronics and Computer Technology Center, Thailand</p> <p>It is well known that implementing a universal hearing screening program is one of the most effective ways for hearing impairment prevention. With limited resource on both medical and supporting staff especially in developing countries, concepts such as teleaudiometry increasingly come in to consideration for this purpose. As a work in progress, this paper discusses the system design, service delivery model, and its key component that is a low-cost software audiometer designed is to run on computers with moderate computing capability such as cost-effective netbooks. The audiometer employs a good dynamic-range, lowlatency professional USB soundcard as the sound source to overcome hardware limitation found in earlier attempts on software-audiometer.</p>
<p>1600hr-1615hr</p> <p>D2-3</p>	<p>Sport Leisure Outdoor Equipment Design for Senior Citizen, Case Study in the North Jakarta Region-Indonesia <i>Aloysius Baskoro Junianto*, Juny Gunawan**, Tri Budi W. Rahardjo***</i> *Universitas Pelita Harapan, Indonesia **Senior Club Indonesia, Indonesia ***Universitas Indonesia Center for Ageing Studies, Indonesia</p> <p>Senior Club Indonesia is a daily meeting place for seniors who live in a residential complex in the North Jakarta. The club gives a 5-day full lively program as a social responsibility commitment of property management to give a holistic service for the three generations: Senior – Adult - Children. The study was undertaken to find senior members need of safe and fun outdoor playground and how the user requirements could be applied into design as also required by the management to provide the public with a place to relax and refresh in a attractive setting of natural greenery as well as being in a resort or in a park. Observation and interview with members, managements, and caregivers were conducted to capture the real needs and requirements from different viewing angles.</p>
<p>1615hr-1630hr</p> <p>D2-4</p>	<p>The Beneficial Effects of Practicing Jianshenqigong-wuqinxin on Subhealth Mental Problems <i>Wang Yan *, Chang-le Chen **, Zhang Zhang**</i> *University of Shanghai for Science and Technology, China, **Shanghai Qigong Institute, China ***Dongzhimen Hospital, China</p> <p>Objective: To discover the mechanism of Jianshenqigong-wuqinxin on subhealth mental problems, we observe the effects of practicing Jianshenqigong-wuqinxin on subhealth mental problems including depression, anxiety, and memory loss. Methods: (1) 80 cases with subhealth problem were randomly divided into two groups. 40 cases practicing Jianshenqigong-wuqinxin were used as test group, and the other 40 unpracticing cases were used as control group. (2) The test group was practising Jianshenqigong-wuqinxin one hour in the morning five</p>

	<p>times per week for three months. (3) Scores of subhealth status such as depression and anxiety were evaluated once every two weeks, while the memory test was performed once a month. (4) Data analysis: SPSS11.0 software was used for statistical analyses. Data were shown in mean \pm SEM. Difference was considered significant if the t-test P value is less than 0.05.</p>
<p>1630hr-1645hr D2-5</p>	<p>Who Should Pay the Price: State or Disabled Rural Individuals? A Low-Income Countries' Perspective <i>Mahtab Ahmad, Mokbul Morshed Ahmad</i> Asian Institute of Technology, Thailand</p> <p>No doubt, adoption of assistive technology enhances functional abilities of disabled individuals. However, assistive equipments are highly costly, and the majority - rural disabled in low income countries cannot afford them and thus remain unaware of assistive technology advancements and its provision. The local policy initiatives in developing world for meeting the assistive technology needs of disabled people are seemed solely busy in large urban centers for the information and communication technology (ICT) provision while elusive for rural disabled. This paper raises a contentious question that in low income economies who should pay the price for various other assistive technology needs which are equally important for rural disabled whether the state or the disabled individuals' families, and in what modes.</p>
<p>1645hr-1700hr D2-6</p>	<p>Risk Management of Esophageal Stents based on the Clinical Data <i>Xianqiang Mi, Erdun Pan, Zhaodan Lu</i> University of Shanghai for Science and Technology, China</p> <p>Medical device manufacturers are responsible for the safety and performance of their products throughout the product lifecycle. Thus, they need to collect and follow up the clinical information and data. We analyzed the clinical reports related to esophageal stent problems from the FDA MAUDE database and also investigated one famous Chinese hospital. The main risks and customer complaints are our findings. Then, we applied the FMEA method and root cause analysis for the two problems 'stent migration' and 'unable to deploy'. The risk management data were updated and measures were given to improve the products. Finally, we believe that medical institutions need also to monitor the clinical data and risk management and communicate proactively.</p>
<p>1700hr-1715hr D2-7</p>	<p>Greatly Enhance National Control and international Competitive Power in the field of Rehabilitation Technical Aids <i>Xiaoyu Zhang</i> National Research Center for Rehabilitation Technical Aids, China</p> <p>The field of rehabilitation technical aids is the health industry. Rehabilitation technical aids industry is a cross-disciplinary and high-tech industry. The market demand for rehabilitation technical aids is growing. Developed countries have been far ahead in the field of rehabilitation technical aids. Macro-control capacity of China must be enhanced in the field of rehabilitation technical aids.</p>

<p>1715hr-1730hr D2-8</p>	<p>Research on Community-Based Monitoring System Based on the IP Network Video Conference Technology <i>PiDing Li</i> University of Shanghai for Science & Technology, China</p> <p>Based on fully research community care system requirements and the current research situation, we introduced a new community monitoring system. The system takes the IP video conference technology as a foundation. Physiological parameter gathering, the transmission, unifies perfectly with the Audio and video guardianship. The system has the formidable management function, not can only carry on the healthy guardianship, You can also use audio and video features, carry on the consultation, counseling, the long-distance condition warned, Through hospital information system interface for remote consultation.</p>
<p>1730hr-1745hr D2-9</p>	<p>Development of a Developmental Skills Instrument for Children aged from birth to 5 years old, Mental Health Department Version, the Ministry of Public Health <i>Chatri Banchuin*</i>, <i>Wacira Pengjuntr Pengjuntr*</i>, <i>Samai Sirithongthaworn**</i> *Department of Mental Health, Thailand **Rajanagarindra Institute of Child Development, Thailand</p> <p>The study of the Development of a Developmental Skills Instrument for Children aged from birth to 5 years old, Mental Health Department Version, the Ministry of Public Health, had the objective of developing an instrument for evaluating children aged from birth to 5 years old. This instrument was developed from a model of the Developmental Skills Inventory while adding other evaluation instruments, such as the Diagnostic Inventory for Screening Children (DISC) and the Denver Developmental Screening Test II. It also reviewed additional relevant literature from experts' comments at meetings held to develop a Developmental Skills Instrument for Children aged from birth to 5 years old, Mental Health Department Version, the Ministry of Public Health. This new version is easy to comprehend and standardize. When the instrument had been developed, the content validity was examined by three experts and then the content validity index (CVI) was calculated.</p>

Authors Index

Ahmad M	D2-5	Chompoobutr S	A1-5
Ahmad M M	D2-5		A1-6
Akbarfahimi M	B2-5	Chua K	B2-6
AlAbdulwahab S	B2-1	Chung Y	C2-9
Ang K K	B1-8	Cooper R	C2-9
Ang W T	B2-7	Dai K R	B2-2
	B1-8	Dain S J	C2-3
Ao H	B1-9	DeMunari I	C2-8
Ao T	A2-7	Ding D	C2-9
Bai Z	B2-9	Ding Y	B2-9
Banchuin C	D2-9	Dovat L	B2-6
Bang Y H	C1-3	Du R	B2-9
	A2-3	Fan Y	B2-3
Bi S	B2-8	Fan Y	C1-5
Boon M Y	C2-3	Friesen E	D2-1
Boriboon M	A1-5	Gao L	C1-8
	A1-6	Gassert R	B2-6
Bridge C	C2-3	Giuggio J	C2-9
Bu J	B1-5	Gossage M	B2-7
Buasri V	C2-7	Grossi F	C2-8
Buchenrieder K	D1-2	Guan C	B1-8
Burdet E	B2-6	Gunawan J	D2-3
Cai B	B1-3	Guo S C	B2-2
	B1-6	Guo Y	C1-8
Cai P	A2-5	Hale L	B1-2
	C1-4	He Y	C1-5
	B1-6	Hemakom A	D2-2
Carabalona R	C2-8		C2-6
Caracciolo A	C2-8	Herrmann J	A1-9
Casey M	A1-7	Herrmann S	D1-2
Castiglioni P	C2-8	Hijmans J	B1-2
Chanjaradwichai S	C2-5	Hongliu Y	B2-4
Chao L V	B1-3	Hu J H	D1-5
Chen C L	D2-4		D1-6
Chen Q H	A2-4	Huang M	B2-2
Cho E J	A2-9	Isaradisaikul S	C2-6
Choi J S	A2-3	Israsena P	C2-6
	C1-3		D2-2

Jang K B	C1-2	Li L	D1-1
Javanshir M A	B2-5	Li P D	D2-8
Jedeeyod J	C2-7	Li P P	D1-5
Jee S H	A2-8	Li Q	B2-2
Ji L H	B2-8	Li S	C1-8
Jiang H	B1-9		A1-4
Jiang H T	B2-2		C1-5
Jiang J	B1-6	Li S G	A2-4
Juan L	A2-2	Liao G S	B2-2
Junianto A B	D2-3	Lin Z	B1-1
Kamali K	B2-5	Liu L	C1-4
Kang B K	A2-9		D1-4
Kang D W	A2-3	Liu S	D1-3
	C1-2	Liu Y	A2-5
	C1-3		A1-8
Kang M S	A2-3		B2-9
Kerdcharoen T	C2-4	Liu Z	A1-1
Khan E	A1-3		C2-1
Kim J	A2-8	Lomas T	A2-6
King M	B1-2	Long H	D1-9
Kou R	B2-3	Lu B	D1-8
Kuah C	B2-6	Lu R R	C1-7
Kutintara B	C2-7	Lu Z	D2-6
Kyung B J	C1-3	Lu Z	D1-7
Lambercy O	B2-6	Ma C	B1-9
Lan N	B1-5	McMillan N	B1-2
	B1-4	Mi X	D2-6
	B2-2		D1-7
Lee L W	A1-2	Milner T	B2-6
Lee M	A2-8	Mun K R	A2-3
Leo K H	B2-7		C1-3
Leo K H	B1-7	Nakata H	A2-1
Li F	C1-6	Navacharoen N	C2-6
	C1-7	Ni W F	B2-2
Li D	B2-3	Noymai A	C2-6
	C1-5		D2-2
Li G	D1-3	Pan E	D2-6
	B1-6	Park S K	A2-9

Pengjuntr W P	D2-9	Tack G R	C1-2
Phantachat W	A1-6		C1-3
	A1-5		A2-3
Pongkittiphan T	C2-2	Tan B Y	B1-7
Pornpatoom K	C2-7	Tan H G	B2-7
Potibal P	A1-6	Tang W	C2-1
	A1-5	Tao C	D1-4
Pu F	B2-3	Teo C L	B2-6
	C1-5	Tessadri A	C2-8
Punyabukkana P	C2-5	Theodoros D	D2-1
	C2-2	Tongrod N	C2-4
Qin G	B2-9	Tuangpermsub N	D2-2
Qu H	B1-4	Tuantranont A	C2-4
Rahardjo T B W	D2-3		A2-6
Riazi A	C2-3	Tutunchi E	B2-5
Russell T	D2-1	Vazquez Lopez J J	C2-9
Saksiri B	C1-1	Veraya L C	C2-7
Sampson M	B1-2	Wang H	B2-9
Satherley J	B1-2	Wang J	A2-7
Shang NN	A2-2		C1-8
Sharma V	C2-9		D1-8
Shee C Y	B1-8		B2-9
Shen X	D1-1	Wang J W	B2-2
Shi P	B1-4		B1-3
Shiju Y	B2-4	Wang Y	D2-4
Shimoda Y	A2-1		D1-8
Shon A	A2-8	Wang Y K	A2-2
Sirithongthaworn S	D2-9	Watthanawisuth N	A2-6
Sitarsang S	C1-1	Wee S K	B2-6
Somboon P	C2-7	Wei C	A2-2
Srettananurak M	C2-7		A2-4
Suchato A	C2-2	Wei D	A1-4
	C2-5	Wu B	B1-6
Suesattabongkot N	C2-2	Wu F	C1-5
Sui P	B1-1	Wu Y	C1-6
Suntornwanitkit S	C2-2		C1-7
Suzuki T	A2-1		

Xie L	B1-3
	C1-4
	B1-6
Xu J	A1-1
	C2-1
Xu X L	C1-6
	C1-7
Yang H T	A2-4
Yang Y	B2-3
Yao L	B1-1
Yao T S	A1-9
Yazawa T	A2-1
Yoo S K	A2-9
	A2-8
Yu H L	D1-5
	D1-6
Yun H	B2-6
Zhang M	B2-3
	A2-7
Zhang Q	D1-8
Zhang T	D1-1
Zhang W	B2-2
Zhang X	D2-7
	D1-4
Zhang Z	D1-3
	D2-4
Zhao L	C1-8
Zhao S	D1-6
Zhao X	B1-4
Zhaohong X	B2-4
Zheng Y	C1-8
Zheng Y C	A2-4
Zhong F	D1-7
Zhou Y	D1-8
Zou R L	C1-6
Zou X	A1-4