# 2014

# i-CREATe

20th - 22nd AUGUST, ITE College East, Singapore

## international

## Convention on
## Rehabilitation Engineering
## & Assistive Technology

Organizers: START CENTRE NECTEC a member of NSTDA

Endorsed By: asean

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*i*-CREATe 2014

*i*nternational Convention on Rehabilitation Engineering & Assistive Technology

20 - 22 August 2014
ITE College East, Singapore

Jointly Organized by:

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

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

# CONTENTS

# General Information

| | |
|---|---|
| **Conference Dates** | 20 – 22 Aug 2014 (Wed, Thu, Fri) |
| **Conference Venue** | ITE College East<br>10 Simei Avenue, Singapore 486047 |
| **Opening Hours** | 8:00pm to 5:30pm daily |
| **Admission** | Open to registered delegates only. |
| **Registration** | Admin Block, Level 3 Foyer |
| **Plenary Sessions** | Admin Block, Level 3 Auditorium |
| **Workshops & Paper Presentations** | Lecture Theatre 1, 2 & Executive LT |
| **SDC Presentations** | Function Hall, Level 3 |
| **SDC & Poster Exhibition** | Function Hall, Level 3 |
| **Lunch and Tea Break** | Admin Block, Level 3 Foyer |
| **Gala Dinner / SDC Award Ceremony** | Hotel Intercontinental<br>on 21 Aug 2014, 6.15pm – 9.30pm<br>**open to FULL pass delegates & SDC winning teams* |
| **Secretariat Room** | Admin Block, Level 3<br>Beside Function Hall |

# Organizing Committees

### General Co-Chairs

Pairash THAJCHAYAPONG, National Electronics and Computer Technology Center (NECTEC), Thailand

Wei Tech ANG, Nanyang Technological University, Singapore

### Program Co-Chairs (Scientific)

Piyawut SRICHAIKUL, National Electronics and Computer Technology Center (NECTEC), Thailand

In-Hyuk MOON, Dong-Eui University, Korea

### Program Co-Chairs (Student Design Challenge)

Kriskrai SITTHISERIPRATIP, National Metal and Materials Technology Center (MTEC), Thailand

Roger GASSERT, Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland

### SDC Committees

Prakasit KAYASITH, Thai Health Promotion Foundation, Thailand

Olivier LAMBERCY, Eidgenössische Technische Hochschule (ETH) Zürich, Switzerland

Jiro SAGARA, Kobe Design University, Japan

Ian GIBSON, Deakin University, Australia

Dennis Ka Yin LO, LifeTec Queensland, Australia

**Publicity Co-Chairs**

Wantanee PHANTACHAT, National Electronics and Computer Technology Center (NECTEC), Thailand

Robyn CHAPMAN, Independent Living Centre Australia

David Lijun JIANG, Republic Polytechnic, Singapore

**Committees for Publicity**

Jackrit SUTHAKORN, Mahidol University, Thailand

Siritham NARANONG, National Nanotechnology (NANOTEC), Thailand

Edwin Tuan Hoe FOO, Nanyang Polytechnic, Singapore

Edwin Heng Siang ONG, Ngee Ann Polytechnic, Singapore

William TAN, Institute of Technical Education (College West), Singapore

Tai Suan TAN, Temasak Polytechnic, Singapore

**Publication Co-Chairs**

Pasin ISRASENA, National Electronics and Computer Technology Center (NECTEC), Thailand

Win Tun LATT, Singapore Polytechnic, Singapore

**Conference Manager**

Chon Hsien CHONG, Institute of Technical Education (ITE) College East, Singapore

**Conference Secretaries**

Sarinya CHOMPOOBUTR, National Electronics and Computer Technology Center (NECTEC), Thailand

Vera YANG, START Centre, Singapore

# Paper Session Information

All chairpersons and paper presenters 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**. No OHP or slide projector will be provided.

For presenters using Microsoft PowerPoint, they are encouraged to bring their files on a USB flash drive (thumb drive) and upload their files at the Secretariat Room on the allocated time below:

**20 Aug 2014**
(1) 1.30pm – 2.00pm
(2) 3.20pm – 3.50pm

Presenters may also use their own laptops if their presentations require special software or codec but please inform the Conference Secretariat in by 20 Aug 2014 of the arrangement.

# Poster Session Information

All poster presenters are given 2 minutes airtime at the allocated paper session on 21 Aug 2014 (see paper presentation sessions for details) and 30 minutes presentation time on 21 Aug 2014 at the Function Hall.

Guidelines for poster presentations

Poster must be presented in A1 poster format at the conference in paper, vinyl or fabric poster of A1 size (594mm x 841mm).

The set up time is on 20 Aug 2014 (Wed) 1.00pm – 2:00pm and should be packed down on 22 Aug 2014 (Fri) by 4:00pm.

Presenters are required to attend their poster session on 21 Aug 2014 from 1:00pm – 1:30pm.

# Site Visits

**20 Aug 2014 (Wednesday), 9.00am – 12.30pm**

## #1 FusionWorld

FusionWorld is an interactive showcase of award-winning inventions and cutting edge in-house and industry-collaboration prototypes created by A*STAR's research institutes. Located on at Fusionopolis, it serves as a platform where visitors get to view some of the latest innovations that are brewing in A*STAR's labs. It also serves as an educational platform for students where the young minds can catch a glimpse of how technologies can help make the world a better place. Come experience the fusion of science and engineering disciplines and let your imagination surge freely in an advanced technology wonderland. Please visit www.fusionworld.sg for more information on FusionWorld.

## #2 Singapore Polytechnic

Singapore Polytechnic's (SP) Centre for Application in Rehabilitation Engineering (SP CARE) was set up since 1993 to provide technical support and services in rehabilitation engineering to the disabled and aged communities. In 2014, the "New SP Care" was set up as an effort to provide a more holistic support and services to the healthcare sector. With silver age as focus, the SP Care aims to provide healthcare innovations in the areas of rehabilitation, assistive technology, vision science, diagnostics, medical devices as well as food and nutrition. In this visit, we would like to bring you on a tour to see some of our innovations in these areas. Please visit www.sp.edu.sg for more information.

# Plenary Sessions

**20 Aug 2014 (Wednesday) at Auditorium, Level 3**

**Professor Kun Min RHEE**
President of Korea Association of Assistive Technology Professionals (KAATP)
South Korea

Time: 2.00pm – 2.40pm

**Professor Rhee** received his Ed.D. in special education technology from Johns Hopkins University (1997). For the first time in Korea, he established a department of rehabilitation science and technology at Daegu University in 1997. Prof. Rhee is a former president of Rehabilitation Engineering and Assistive Technology Society of Korea (RESKO) and he is currently the President of Korea Association of Assistive Technology Professionals (KAATP) and also the head of Daegu Assistive Technology Center which is the one of 9 centers funded by the Korea Ministry of Health and Welfare. He is also serving as a Chairman of the Love & Light College Educational Foundation.

## Assistive Technology Service Delivery System in Korea

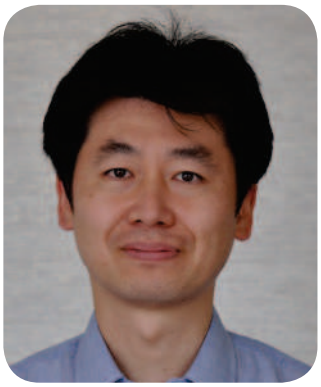
Korea is considered one of the fastest aging population in the world. 11.8% of entire population is older than 65 years old in 2012. Currently, Korean government provides RE & AT public funding under 4 ministries (Ministry of Health & Welfare, Ministry of Employment and Labor, Ministry of Veterans Affairs (VA), Ministry of Science, ICT & Future Planning). Overall public funding source has increased from USD 0.98 billion (2008) to USD 1.35 billion (2011). Currently, 9 assistive technology centers are run by the Ministry of Health & Welfare. At least two centers will open every year. Korea Orthopedics & Rehabilitation Engineering Center provides orthopedics and assistive technology service to people with disabilities through 5 regional centers. There are five prosthetics & orthotics centers which are run by the regional Veterans hospital. In order to reduce information gap, assistive devices for information and communication are provided to 4,000 people with disabilities every year.

**Dr Krissada RUANGAREERAT**
CEO of Thai Health Promotion Foundation
Thailand

Time: 2.40pm – 3.20pm

**Dr. Krissada RUANGAREERAT** is a Chief Executive Officer (CEO) of Thai Health Promotion Foundation (ThaiHealth), an independent public agency to inspire, motivate, coordinate and empower individuals and organizations in all sectors for the enhancement of health promotive capability as well as healthy society and environment. Dr. Krissada obtained his medical doctor of dental surgery from Chulalongkorn University and Master of Science (Computer Science), Chulalongkorn University. Prior to working as CEO of ThaiHealth, he was the chair of the International Network of Health Promotion Foundation (INHPF). As the CEO of ThaiHealth, he is responsible for the success of the organization and ensures the accomplishment of its vision and mission and accountability to its diverse constituent. Under his leadership, ThaiHealth has transformed to one become the main actors in Health Promotion Movement in Thailand. One of Thai health major strategic plan is to improve the quality of life of vulnerable populations. The organization currently works with multi-sectoral national and international partners to create innovative health promotion activities for elderly and disable groups.

**Towards inclusive society; case study on people with disabilities in Thailand**
ThaiHealth pursues to coordinate and empower both governmental and civil societal organizations. It aims to mobilize participatory social movements and innovations to establish inclusive society in Thailand. With the prospect, ThaiHealth's works, regarding the well-beings of people with disabilities and the elderly, were not limited only within the health sector. It also takes into account the importance of social and economic aspects which affect the well-beings and the improvement of quality of life of the population groups. ThaiHealth acknowledges the significance to develop holistic health. The vision results in the creation of innovations in various forms. In this session, we will explore a set of development projects to improve the quality of life of people with disabilities as a case study. The case study is a good example to represent the implementation of health promotion with multi-sectoral approach.



**Dr-Ing Yuchiro HONDA**
Special Researcher at the Robot Rehabilitation Center in the Hyogo rehabilitation central hospital and the Hyogo Institute of Assistive Technology, Japan

Time: 3.50pm – 4.30pm

**Dr. Yuichiro Honda** is the Special Researcher at the Robot Rehabilitation Center in the Hyogo Rehabilitation Central Hospital and the Hyogo Institute of Assistive Technology, Japan. Dr Honda obtained a “Doctor Ingenieur” (Doctoral Title in engineering) at Technische Universitaet Muenchen (Technical University of Munich). He has wide knowledge in the field of human-machine interface according to hardware/software development. He bridges between technical side and clinical side in order to start needs-oriented projects for users of assistive technology. He is now working with medical staff at the Robot Rehabilitation Center in the Hyogo Rehabilitation Central Hospital on Evidence based Medicine (EBM) in the Rehabilitation field.

## Robot Rehabilitation Center in Japan

The Robot Rehabilitation Center in the Hyogo Rehabilitation Central Hospital is the leading facility merging clinical application and technical development in disabled people in Japan. The center is working in two parts: clinical and engineering. The clinical part works mainly is to train the patients, especially with myoelectric hands, computer controlled knee prostheses, and robot suits. The engineering part develops new tools in the clinical field. It will be most ideal when clinicians and engineers can cooperate and work closely for patients. For clinicians, they will be able to get a new tool, which they want to use for patients. For engineers, they can do the best to realize a new tool, which is what the clinicians would want to use. We have already developed some tools where the therapists are using them in their daily work. Now we are trying to make them as products to benefit all the clients who needed them.

**Mr Huy NGUYEN**
CEO, Enable Development
2014 ACT Young Australian of the Year
Australia

Time: 4.30pm – 5.10pm

## Mr Huy NGUYEN

is the CEO, Enable Development and 2014 ACT Young Australian of the Year**,** is a humanitarian engineer, social entrepreneur, traveller and portrait artist. He was born in Vietnam and contracted polio when he was 18 months old. At age 6 his parents brought him to Canberra, Australia to be reunited with the rest his family for a better chance at life. He now has a passion for disability inclusive development through his own personal experience combined with his professional training. Huy has been involved in numerous initiatives addressing the challenges of people with disability in Australia and developing countries. These projects include creating an assistive technology program with the Australian National University, co-founding a technology for social change co-working studio in Melbourne, founding the social enterprise Enable Development, which provides inclusion training for mainstream organisations and long term capacity building of people with disability internationally.

## Enabling Technologies

Australia is one of the most developed countries in the world yet there are still major barriers for people with disability to acquire assistive technology. The two main reasons for this are due to high cost and high level of technical knowledge needed to create your own. Huy Nguyen will share his journey of contracting polio as a child in Vietnam, migrating to Australia where he started to use a wheelchair and now leading the charge to disrupt and innovate the current assistive technology industry in Australia. His social enterprise Enable Development has started this journey by collaborating with the Australian National University to launch the Enable Technology Learning Program. Where people with disability are empowered to dream up and create their own assistive device, through leveraging from existing educational institution resources and the latest trends in technology, such as 3D Printing. The end users will be at the forefront of the program from beginning to end, not just as the person with the idea/problem. They will gain the resources and skills from the program such as entrepreneurship leading to low cost solutions and scalability.

# Workshop Sessions

## Special Needs

### Workshop 1 - Learning Disabilities

**21 Aug 2014 (Thursday) 9.00am – 5.00pm, Lecture Theatre 1 (Level 3)**

by Kasetsart University, Bangkok Thailand
The National Electronics and Computer Technology Centre (NECTEC), Thailand
Queen Sirikit National Institute of Child Health, Thailand

Workshop on Learning Disabilities recruits various persons involved with cases of learning disabilities in Thailand. The objectives of this workshop focus on sharing experience in case study of learning disabilities in writing and reading. The presenters will provide us their valuable knowledge relevant to assessment, treatment, therapy, teaching, and linguistic analysis particularly involving the phonological awareness. Moreover, the workshop aims to offer opportunities to build up the collaboration among the researchers.

**Dr Puttachart POTIBAL**
Lecturer of Linguistic Department
Dean of Faculty of Humanities
Kasetsart University
Bangkok, Thailandt

**Puttachart Potibal** has a Ph.D. in Linguistics, specialized in Phonetics, Phonology, and Comparative and Historical Linguistics. At present she is the lecturer of Linguistic Department, and also the Dean of Faculty of Humanities, Kasetsart University, Bangkok, Thailand. Her working experience includes lecturing in Prince of Songkla University, Pattani, and Silpakorn University, Nakorn Pathom, Thailand, and Hankuk University of Foreign Studies, Seoul, Republic of Korea. Since 2009, she has spent her interest in dyslexia and does researches in linguistics applied to support the research and development of assistive technology for people with difficulties in reading and writing.

**Other Trainers**

**Piyaporn Nak-artit, Sineenart Ratanapan, Alisa Kumkiam, Mukda Suktarajan, Sasin Tiendee**
Kasetsart University, Thailand
**Wantanee Phantachat, Onintra Poobrasert, Alisa Suwanarat**
National Electronics and Computer Technology Center (NECTEC), Thailand
**Piyanart Kururatanakorn**
Queen Sirikit National Institute of Child Health, Thailand

## Social Services

# Workshop 2

## Empowerment & Choice: Building Consumer Capacity in Person Centred Service Provision

**21 Aug 2014 (Thursday) 1.30pm – 3.00pm, Lecture Theatre 2 (Level 3)**

by Independent Living Centre NSW, Australia

The workshop covers areas of policy and program delivery that relate to supporting the new philosophy of person centredness and individual control and as such is relevant to any person working with and for people with disabilities, and people with disabilities themselves. It is particularly relevant to any professional providing Assistive Technology (AT), including health professionals and information providers. We will also discuss the creation of a training, employment and career path that utilizes the lived experience of people with disabilities in support of others. AT related professionals will gain an insight into the development of person centred practice and gaps in delivery, from an Australian policy perspective. It is hoped that the workshop will lead to a better understanding of person centred practice that may be of use in other jurisdictions and the discussion may facilitate other options for increasing consumer capacity.

**Ms Robyn CHAPMAN**
CEO
Independent Living Centre
NSW, Australia

**Ms Robyn CHAPMAN** B.App.Sc (Phty) is the Chief Executive Officer, Independent Living Centre NSW. Robyn has 35 years of experience in the health, disability and ageing service delivery sectors in NSW, Australia as a Physiotherapist, in administration, in teaching and in systemic advocacy. Robyn several systemic and research advisory roles being a member of: EnableNSW Advisory Council; the UNSW Dementia Research Centre; the USyd Consultative Group (Discipline of Occupational Therapy); the AT Collaboration. Robyn has led the Independent Living Centre NSW though significant change, including the need to embrace a web based model as an integrated model of information service delivery on AT.

## Workshop 3

### Moving from 'not for profit' to a sustainable social enterprise business model

**21 Aug 2014, Thursday 3.30pm – 5.00pm, Lecture Theatre 2 (Level 3)**
by Independent Living Services, Auckland New Zealand

The Independent Living Service (ILS) is a not for profit organisation in Auckland New Zealand providing generic information and advice to people with disabilities, their families and support workers (1981). In 2010 ILS employed Karen as their CEO to refresh the brand and services provided to Auckland communities. ILS is now working to a sustainable social enterprise model growing the assistive technology retail showroom and innovation of a mobile service. Karen will share their growth in diversifying revenue streams whilst maintaining government contracts. Their new retail concept store, September 1, selling assistive technologies to a wide range of people including the Baby Boomer market which is set to double in New Zealand in the next 20 years.

**Ms Karen BEARD-GREER**
Chief Executive
Independent Living Service
Auckland, New Zealand

**Ms Karen BEARD-GREER** is the CEO of the Independent Living Service moving them from a traditional not for profit business model to a more sustainable social enterprise model. She has been implementing this model for the past 4 years. She comes from the business sector having 20 years' experience running a variety of businesses and speaking professionally.

# Assistive Technology

## Workshop 4
## Assistive Technology for people with special needs
**22 Aug 2014 (Friday), 9.00am – 5.30pm, Lecture Theatre 1 (Level 3)**
by Singapore General Hospital, Singapore
Singapore Polytechnic, Singapore
SPD, Singapore,
The National Electronics and Computer Technology Centre (NECTEC), Thailand

It is important to realize that there are many different kinds of disabilities, and that new technologies have been developed to assist those who possess one or more of them. Assistive Technology (AT) plays a major role in enabling people with disabilities to engage in their occupations of choice and participate fully in the community. The use of appropriate AT promotes independence, enables participation in personal activities, communication, productivity, leisure and improves quality of life.

This full day workshop will provide participants with a basic introduction to the principles and sciences of AT, assessment of needs/goal identification, characteristics of technologies available to meet client needs. Case studies will be presented to illustrate the application of AT in achieving independence in their daily activities. Participants will also be able to better understand the different type of AT devices through experiential learning activities.

**Mr. Ronny THAM**
Deputy Director,
School of Mechanical and Aeronautical Engineering, Singapore Polytechnic

**Mr Ronny Tham** is the Deputy Director of School of Mechanical and Aeronautical Engineering. He used to manage the Singapore Polytechnic Centre for Applications in Rehabilitation (SP CARE) since 2004 and started the Assistive Technology (AT) Centre in 2006. In 2004, SP CARE was awarded the Samsung DigitAll Hope Award for the development of assistive devices for people with special needs. He has been conducting lectures, training in assistive technology and rehabilitation for students as well as for therapist, engineers and practitioners of AT. His area of specialty is in mobility training and assessment. He brings with him many years of working experience with clients of different disabilities.

**Mr Andrew Hock Soon CHIA**
Principal Occupational Therapist
Department of Occupational Therapy
Singapore General Hospital

**Mr Andrew Hock Soon CHIA** is the Principal Occupational Therapist of Singapore General Hospital. Prior to this, he was the Senior Occupational Therapist of Independent Living Centre NSW. He has 7 years of clinical experience in acute and secondary health settings, and 3 years of commercial experience in an assistive technology firm. Having obtained a Diploma in Mechanical Engineering and a Degree in Occupational Therapy, Andrew has also recently completed his Masters of Special Education with University of Newcastle. His interests include the application of high technological solutions to enhance level of independence of people with various conditions. He also has a keen eye on research and development of assistive technology.

**Ms Sarah YONG**
Assistive Technology Specialist
Clinical Head at the Specialised ATC
SPD, Singapore

**Ms Sarah Yong** is an Assistive Technology Specialist and Clinical Head at the Specialised ATC, Society for the Physically Disabled. She is a certified RESNA Assistive Technology Professional (ATP). She also holds a Certificate of Advanced Professional Development in Assistive Technology (AT) Applications from the California State University, Northridge, USA. A Speech Therapist by training, she holds a Master of Arts in Speech Language Pathology from the University of Texas at Austin. Her roles at the Specialised ATC include enabling individuals with complex communication needs with the ability to express themselves through both low tech and high tech AAC solutions.

**Ms Wantanee PHANTACHAT**
Senior Division Director
Institute of Technology for Persons with Disabilities & Elder Persons
The National Electronics Computer Technology Centre (NECTEC), Thailand

(No details at the time of printing)

# Universal Design for All

## Workshop 5
## Mobility for the Blind: The Impact of Urban Design and Smart Navigation Technology

**22 Aug 2014 (Friday) 11.00am – 12.30pm Lecture Theatre 2 (Level 3)**
by Royal Society for the Blind, Australia

This workshop will explore the impact of Universal Design on the ability of people who are blind or vision impaired to participate and navigate the community and is design as an interactive discussion and will allow participants to explore in Mobility trends not only in Australia but on a local basis relating to participants experiences. The trainers will share their experienced as a consumer and will provide a history of the journey over the past 30 years of the access to information, technology, employment opportunities, urban design and the acceptance of the principals of Universal Design/Inclusive Design. They will also discuss the opportunities being created by Smart Technology that work in conjunction with the White Cane (primary mobility device).

**Mr Tony STARKEY**
Government Relations & Accessibility
Royal Society for the Blind of SA Inc
Deputy Chair of the Australian Blindness Forum

**Tony** is employed as the Government Relations and Accessibility for the Royal Society for the Blind in Australia. He has had a long association with the blindness sector after becoming partially blind at aged 15 years. Tony was employed in Banking/IT, Marketing and Fundraising and has been advising Government and Business for over 30 years on accessibility to allow people who are blind or vision impaired to independently participate in the community. He is also the Deputy Chair of the Australian Blindness Forum and represents them on Standards Australia Committees, the Federal governments Accessibility Advisory Forum on Aviation matters and the Australian Electoral Commission. He is also one of the four Australian Delegates to the World Blind Union, and is a member of the South Australian Transport Access Advisory Group, and a number of Local Government Disability Reference Groups. Tony is a believer in the concept of Universal Design and believes if you make it accessible for people with disabilities the whole of the community will benefit.

**Mr Noah TAVOR**
Orientation and Mobility Instructor
Royal Society for the Blind
Australia

**Noah Tavor** works as an Orientation and Mobility Instructor at the Royal Society for the Blind in South Australia. Noah is a two year Orientation and Mobility Instructor having graduated from the University of Arizona with a Bachelor's Degree in Special Education in May 2011 and a Master's Degree in Orientation and Mobility he received in May 2012. Noah's work experience includes a practicum and internship at the Southern Arizona Blind Rehabilitation Center in Tucson, Arizona.

## Workshop 6
## Designing based on Universal Design concept to enhance the quality of life for all in the rural areas in Thailand

**22 Aug 2014 (Friday) 2.00pm - 3.30pm Lecture Theatre 2 (Level 3)**

By Thai Health Promotion Foundation and Thammasat University, Thailand

Physical environment of the community has an impact on both physical and psychological of people life and also a visible mean of social and cultural appearances. This workshop will present a design solution based on Universal Design by active participation of the stakeholders. We have worked on 3 rural sites in Thailand, including Nakhon Ratchasima province, Rungsit municipal and Thatako district. The results revealed that the active participation of all stakeholders though out the process was a key successful factor. The 4 major stakeholders were site owner, local government, community people and academic supporter. They all played an important roles in designing the physical environment for all by integrating the needs and preferences of person with diverse array of abilities in the Thailand context based on 2 perspectives, ie physical perspective including: safety, equity, simply, accessibility, perceptibly and easily maintenance and psychological perspective including: enhanced active participation and relationship, in response to people belief and fine without feeling any undue inconveniences.

**Mr Choomket SAWANGJAROEN**
Lecturer
Faculty of Architecture and Planning
Thammasat University, Thailand

**Mr Sawangjaroen** is a Lecturer in department of Landscape Architecture and he is an Assistant to the Rector for Student Affairs and Learning of Thammasat University. He graduated from Chulalongkorn University with a master degree in Landscape Architecture. He is currently studying for a PhD in Sustainable Land Use and Natural Resource Management at Kasetsart University in Thailand. His working experience includes teaching, research, architecture and landscape architecture design. Especially on the field of design for people with disabilities and the elderly people in Thailand. He is in a committee that represents the Ministry of Social Development and Human Security to monitor the facilities for the people with disabilities and select a place that is friendly to people with disabilities.

## Workshop 7
## Enabled Design: Interactive User Centered Design Session
**22 Aug 2014 (Friday) 4.00pm - 5.30pm Lecture Theatre 2 (Level 3)**
by Enable Development, Australia

Enabled Design Workshop: An engaging and interactive educational session that develops skilled practitioners who will contribute to building a more inclusive society for people with access needs, such as people with disability. Participants in this session will be facilitated through a hand on user centered design activity of constructing an accessible an inclusive scaled model inclusive and accessible toilet as a case study. This session is suitable for designers, architects, engineers, occupational therapists, community development practitioners and students who may be overwhelmed and uncertain about how to address and produce appropriate solutions for people with disability. The session will introduce to participants the frameworks of a social model of disability and user centered design, and how it can be practically applied to developing assistive technology and designing the built environment.

**Mr Huy NGUYEN**
CEO, Enable Development
2014 ACT Young Australian of the Year
Australia

**Mr Huy NGUYEN** is the CEO, Enable Development, 2014 ACT Young Australian of the Year**,** is a humanitarian engineer, social entrepreneur, traveller and portrait artist. He was born in Vietnam and contracted polio when he was 18 months old. At age 6 his parents brought him to Canberra, Australia to be reunited with the rest his family for a better chance at life. He now has a passion for disability inclusive development through his own personal experience combined with his professional training. Huy has been involved in numerous initiatives addressing the challenges of people with disability in Australia and developing countries. These projects include creating an assistive technology program with the Australian National University, co-founding a technology for social change co-working studio in Melbourne, founding the social enterprise Enable Development, which provides inclusion training for mainstream organisations and long term capacity building of people with disability internationally.

# Emerging Rehabilitation Technologies

## Workshop 8
## Brain-Computer Interface, Robotics & Serious Game Workshop
**22 Aug 2014, Friday, 2.00pm – 5.30pm Executive LT (Level 3)**

by Infocomm Research, Agency for Science, Technology and Research(A*STAR), Singapore
Nanyang Technological University, Singapore
Gamification and Enabling Technologies Strategic Solutions, United Kingdom (via SKYPE)

This workshop presents three popular emerging rehabilitation technologies: (i) Robotics, (ii) Brain-Computer Interface & (iii) Serious Games. The speakers shall share with the audience the critical issues of using these technologies in rehabilitation, which include: clinical relevance, state-of-the-art technologies and social-economic considerations. There will be a short discussion between the speakers and audience on the future trend of these technologies.

**Prof Wei Tech ANG**
Associate Professor
Nanyang Technological University
Singapore

**Prof Ang** is an Associate Professor at the Nanyang Technological University, Singapore. He holds concurrent appointment as Head, Division of Engineering Mechanics and Director (Outreach) at the School of Mechanical & Aerospace Engineering. He received his Ph.D. degree in Robotics from Carnegie Mellon University in 2004, M.Eng. and B.Eng. degrees in Mechanical Engineering from Nanyang Technological University in 1999 and 1997 respectively. Dr Ang is one of the most active and well-funded robotic scientists in Singapore. His research focuses on robotics technologies in Biomedical applications, which include robot assisted microsurgery & cell micromanipulations, assistive & rehabilitation technology for the disabled, etc. Prof Ang is also an activist in the promotion of technology to assist and empower the disabled and aged for quality independent living. He is a founder of the International Convention on Rehabilitation Engineering and Assistive Technology (i-CREATe).

**Prof Kai Keng ANG**
Head of Brain-Computer Interface Laboratory
Scientist
Institute for Infocomm Research,
Agency for Science, Technology and Research,
i2-R, A*STAR
Singapore

**Kai Keng Ang** received his B.A.Sc. (First Class Hons.) and his Ph.D. degrees in computer engineering from Nanyang Technological University, Singapore. He is currently the Head of Brain-Computer Interface Laboratory and a Scientist with the Institute for Infocomm Research, Agency for Science, Technology and Research, Singapore. He is also an Adjunct Asst. Prof. in the School of Computer Engineering, Nanyang Technological University, Singapore. His current research interests include brain–computer interfaces, computational intelligence, machine learning, pattern recognition, and signal processing

**Mr David WORTLEY**
Founder and CEO of GAETSS

**Mr David Wortley**, Gamification Expert and Mr Simon Stevens, a UK based disabled entrepreneur with cerebral palsy. Simon is a very intelligent capable young man who has been empowered in his battle against people's reaction to his condition throughout his whole life. David introduced him to Second a Life (Serious Game) and his development of a virtual nightclub called Wheelies brought him international recognition and a lot of media attention. David will introduce the presentation and help Simon tell his story with slides (he has a bad speech defect) and draw some observations before taking questions.

Skype session will be facilitated by
Mr Lee Seng Beo and Mr Ivan Boo
organizing committees for Serious Game Conference, Singapore 2015

# *i*-CREATe 2014 Program Overview (ITE College East, Singapore)

## Day One - 20 August 2014 (Wed)

| Time | Function Hall (Level 3) |
|---|---|
| 0800 to 0900 | Registration at Foyer (Level 3) |
| 0900 to 1300 | |
| 1300 to 1400 | |
| 1400 to 1520 | SDC Registration & set up |
| 1520 to 1550 | SDC Exhibits |
| 1550 to 1710 | |

| Time | Auditorium (Level 3) |
|---|---|
| 0800 to 0900 | Registration at Foyer (Level 3) |
| 0900 to 1300 | Technical Tour<br>Tour A : FusionWorld (A*STAR) or<br>Tour B : Singapore Polytechnic<br>(advance registration is require as seats are limited - closed on 18 Aug 2014) |
| 1300 to 1400 | Lunch |
| 1400 to 1520 | Plenary Sessions<br><br>Dr Rhee Khun Min,<br>Korea Association of Assistive Technology Professionals (South Korea)<br><br>Dr. Krissada Ruangarreerat, Thai Health Promotion Foundation (Thailand) |
| 1520 to 1550 | Tea Break |
| 1550 to 1710 | Dr. -Ing Yuichiro Honda,<br>Hyogo Reha-Center & the Hyogo Institute of Assistive Technology (Japan)<br><br>Mr Huy Nguyen,<br>Enable Development, 2014 ACT Young Australian of the Year (Australia) |

## Day Two - 21 August 2014 (Thu)

<table>
<tr><th>Time</th><th colspan="2">Function Hall (Level 3)</th></tr>
<tr><td>0800<br>to 0900</td><td colspan="2">Registration at Foyer (Level 3)</td></tr>
<tr><td>0900<br>to 1030</td><td rowspan="3">SDC Exhibition<br>(Judges Walk Thru -<br>Design)</td><td rowspan="3">SDC<br>Presentation<br>(Technology)</td></tr>
<tr><td>1030<br>to 1100</td></tr>
<tr><td>1100<br>to 1230</td></tr>
<tr><td>1230<br>to 1330</td><td colspan="2">Lunch</td></tr>
<tr><td>1330<br>to 1500</td><td rowspan="3">SDC Exhibition<br>(Judges Walk Thru -<br>Technology)</td><td rowspan="3">SDC<br>Presentation<br>(Design)</td></tr>
<tr><td>1500<br>to 1530</td></tr>
<tr><td>1530<br>to 1700</td></tr>
<tr><td>1720<br>to 1800</td><td colspan="2">Bus to depart ITE East for Gala Dinner</td></tr>
<tr><td>1815<br>to 2130</td><td colspan="2">Gala Dinner at Hotel Intercontinental<br>(Guests to be seated by 1830hr)</td></tr>
</table>

| Time | Lecture Theatre 1 (Level 3) | Lecture Theatre 2 (Level 3) |
|---|---|---|
| 0800 to 0900 | Registration at Foyer (Level 3) | |
| 0900 to 1030 | **Workshop 1** Learning Disabilities Workshop | Paper Presentations - P1 Rehab Technology |
| 1030 to 1100 | Tea Break | |
| 1100 to 1230 | by Kasetart University Thailand | Paper Presentations - P2 Rehab & Bio Science Tech |
| 1230 to 1330 | Lunch | |
| 1330 to 1500 | National Electronics & Computer Technology Center (NECTEC) Thailand | **Workshop 2** Disabilities Services Empowerment & Choice by Independent Living Centre, Australia |
| 1500 to 1530 | Tea Break | |
| 1530 to 1700 | Learning Disabilities Workshop | **Workshop 3** Moving from 'not for profit' to a sustainable social enterprise business model by Independent Living Service, New Zealand |
| 1720 to 1800 | Bus to depart ITE East for Gala Dinner | |
| 1815 to 2130 | Gala Dinner at Hotel Intercontinental (Guests to be seated by 1830hr) | |

## Day Three - 22 August 2014 (Fri)

<table>
<tr><th>Time</th><th>Function Hall (Level 3)</th><th>Lecture Theatre 1 (Level 3)</th></tr>
<tr><td>0800<br>to 0900</td><td colspan="2">Registration at Foyer (Level 3)</td></tr>
<tr><td>0900<br>to 1030</td><td rowspan="3">SDC Exhibition<br>(HRH visit)</td><td>Workshop 4<br>Assistive Technology for people with special needs</td></tr>
<tr><td>1030<br>to 1100</td><td>Tea Break</td></tr>
<tr><td>1100<br>to 1230</td><td>by Singapore General Hospital (SGH)<br>SPD</td></tr>
<tr><td>1230<br>to 1400</td><td colspan="2">Lunch</td></tr>
<tr><td>1400<br>to 1530</td><td>SDC Exhibition</td><td>Singapore Polytechnic (SP), Singapore</td></tr>
<tr><td>1530<br>to 1600</td><td colspan="2">Tea Break (SDC Awards Ceremony)</td></tr>
<tr><td>1600<br>to 1730</td><td></td><td>National Electronics and Computer Technology Center (NECTEC)<br>Thailand</td></tr>
</table>

| Time | Lecture Theatre 2 (Level 3) | Executive LT (Level 3) |
|---|---|---|
| 0800 to 0900 | Registration at Foyer (Level 3) | |
| 0900 to 1030 | Paper Presentations - P3 Assistive & Rehab Tech | |
| 1030 to 1100 | Tea Break | |
| 1100 to 1230 | **Workshop 5** Mobility for the Blind: The Impact of Urban Design & Smart Navigation Technology (Royal Society for the Blind, Australia) | |
| 1230 to 1400 | Lunch | |
| 1400 to 1530 | **Workshp 6** Using UD concept to enhance the quality of life for all in the rural areas in Thailand by Thai Health Promotion Foundation | **Workshop 8** Emerging Rehab Tech - BCI, Robotics & Serious Games |
| 1530 to 1600 | Tea Break (SDC Awards Ceremony) | |
| 1600 to 1730 | **Workshop 7** Enabled Design: Interactive User Centered Design Session by Enable Development, Australia | by Nanyang Technological University, i2R A*STAR, Singapore GATESS United Kingdom |

# Paper Presentations

P1 – Rehabilitation Technology (21 Aug 2014)
9.00am – 10.30am
Lecture Theatre 2 (Level 3)

| | |
|---|---|
| P1.1<br><br>9.00am<br>to<br>9.15am | **Characterization of Soft Bending Actuator for Rehabilitation Application**<br><br>Hong Kai YAP, James Cho Hong GOH, Raye Chen Hua YEOW<br>National University of Singapore |
| P1.2<br><br>9.15am<br>to<br>9.30am | **Analysis of therapist's guiding motion for standing up training of hemiplegic stroke patient**<br>*Yoshifumi MORITA, *Jung-Tang WANG, *Lin HAN, Kazunori *YAMAZAKI, Noritaka SATO, **Hirofumi TANABE<br>*Nagoya Institute of Technology, **Self Defense Force Central Hospital |
| P1.3<br><br>9.30am<br>to<br>9.45am | **Detection of anxiety through analysis of occipital EEG**<br><br>Shruthi SURESH, Chen Hua YEOW<br>National University of Singapore |
| P1.4<br><br>9.45am<br>to<br>10.00am | **Soft robotic monitoring of finger during neuromuscular electrical stimulation with varying electrode placements**<br>Andrew John MCDAID, Jinu Rose THOMAS<br>The University of Auckland, New Zealand |
| P1.5<br><br>10.00am<br>to<br>10.15am | **Research on Barrier-free Home Environment System Based on Speech Recognition**<br><br>ZHU Hu-sheng, Hong Liu YU, JIAN Zhuo<br>University of Shanghai for Science and Technology |
| P01.1<br><br>10.15am<br>to<br>10.20am | **Improvement of Cursor Movement Control Software with Estimate Function Corresponding to Individuals with Disabilities**<br>Takashi WATANABE, Takuro HATAKEYAMA, Noriyuki TEJIMA<br>Nihon Fukushi University |

| | |
|---|---|
| P01.2<br><br>10.20am<br>to<br>10.25am | **Interface design for a shared control, tele-operated power wheelchair.**<br>*Emma M. SMITH, *William C. MILLER, **Alex MIHAILIDIS, *W.Ben MORTENSON, **Pooja VISWANATHAN, **Jonathan LO, **Patrick PHAM<br>*University of British Columbia, **University of Toronto, Canada |
| P01.3<br><br>10.25am<br>to<br>10.30am | **Evaluation of a Mechanical Turning Transfer Device among Patients on an Acute Geriatric Ward in South East Asia**<br><br>Muslimah, Y.[1,4,] Goh, C. H. [2,3], Ng, S. C.[3], Subramanian, P.[2,4,] Tan, M. P.[2,5]<br>[1.] Institute for Public Health, Kuala Lumpur, Malaysia, [2]. Ageing and Age-Associated Disorders Research Group, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia, [3.] Department of Biomedical Engineering, Faculty of Engineering, University of Malaya, Kuala Lumpur, Malaysia, [4.] Department of Nursing Science, Faculty of Medicine University of Malaya, [5]. Division of Geriatric Medicine, Department of Medicine, Faculty of Medicine, University of Malaya |

**P2 – Rehabilitation / Bioscience Technology (21 Aug 2014)**
**11.00am – 12.30pm**
**Lecture Theatre 2 (Level 3)**

| | |
|---|---|
| P2.1<br><br>11.00am<br>to<br>11.15am | **Control and GUI Design for a Robotic Rehab System**<br><br>Nassaree BENALIE, Witsarut SUPSI, Winai CHONNAPARAMUTT<br>National Electronics and Computer Technology Center (NECTEC)<br>Thailand. |
| P2.2<br><br>11.15am<br>to<br>11.30am | **Game Design for a Robotic Rehab System**<br><br>Witsarut SUPSI, Nassaree BENALIE, Winai CHONNAPARAMUTT<br>National Electronics and Computer Technology Center (NECTEC)<br>Thailand. |
| P2.3<br><br>11.30am<br>to<br>11.45am | **Musculoskeletal analysis of people with stroke practicing Sit-to-Stand motion using a walker**<br><br>*Dong-Pyoung SHEEN, *Kunwoo LEE, **Byung-Woo KO, **Won-Kyung SONG<br>*Seoul National University, **National Rehabilitation Research Institute, South Korea |

| | |
|---|---|
| P2.4<br><br>11.45am<br>to<br>12.00pm | **Redistribution of Plantar Pressure with Pneumatic Insole**<br><br>Jin Huat LOW, Khin Phone MAY, Chen Hua YEOW<br>National University of Singapore |
| P2.5<br><br>12.00pm<br>to<br>12.15pm | **A novel method to measure blood flow in the popliteal vein using ultrasound Doppler system**<br><br>Fanzhe LOW, Hong Kai YAP, Jeong Hoon LIM, Chen Hua YEOW<br>National University of Singapore |

**P3 – Assistive & Rehabilitation Technology (22 Aug 2014)**
**9.00am – 10.30am**
**Lecture Theatre 2 (Level 3)**

| | |
|---|---|
| P3.1<br><br>9.00am<br>to<br>9.15am | **SensibleTAB Robotic Device for Hemiplegic Shoulder and Arm Function Rehabilitation: Preliminary Clinical Results**<br><br>*Jakkrapun CHUANASA, **Parit WONGPHAET, ***Prakarnkiat YOUNGKONG<br>*Thammasat University, **Department of Rehabilitation Medicine<br>***Institute of Field Robotics, KMUTT, Thailand |
| P3.2<br><br>9.15am<br>to<br>9.30am | **Towards an Upper-limb Exoskeleton System for Assistance in Activities of Daily Living (ADLs)**<br>*Win Tun LATT, *Luu Trieu PHAT, **Christopher KUAH<br>*Singapore Polytechnic, **Tan Tock Seng Hospital, Singapore |
| P3.3<br><br>9.30am<br>to<br>9.45am | **Capacitive Measurements of PDMS Micro Sensors for Limp-Socket Interface**<br><br>Tana WICHITO, Eakkachai PENGWANG<br>Institute of Field Robotics, KMUTT, Thailand |
| P3.4<br><br>9.45am<br>to<br>10.00am | **Drishti- An Ultra-Low Cost Visual-Aural Assistive Technology for the Visually Impaired**<br><br>*Arnav KAPUR, **Shreyas KAPUR<br>*Indian Institute of Technology, New Delhi, India<br>**Modern School, India |

# Student Design Challenge 2014

The Student Design Challenge 2014 is into the 7th installment. The SDC encourages students to find creative and innovative solutions to improve the quality of living of elderly and people with disability. For this year, there will be two categories for the challenge:

Design Category
Students are expected to apply User-Centered Design process to produce a concept that makes life easier for its users. Their solution could use any type of technology and result in an improvement to the quality of life, 'make life easier' for its users or enhance the user experience of the solution.

Technology Category
Student entries are expected to apply principles in engineering and information technology principles to design and implement Assistive & Rehabilitative Technology solution to address the issues/problems faced by the needy, their caregiver and clinicians.

**Presentation**
All teams are required to do an oral presentation covering the key ideas of the project. The presentations are scheduled at 9:00am – 5:00pm on 22 Aug 2014 and will be will be held at the Function Hall. Each presentation is 5 minutes and 2 mins for Q&A.

**Poster & Prototype Display**

All teams are required to display their poster and prototype at the Student Design Challenge Exhibition Area, from 20 Aug 2014, 3:00pm – 5.30pm & 21-22 Aug 2014 from 9:00am – 5:30pm. At least one team member must be present at their booth during the above session.

## Awards

| | |
|---|---|
| **Champion** | Trophy, USD1,400 & certificate for all members |
| **1st Runner-up** | Trophy & USD700 & certificate for all members |
| **2nd Runner-up** | Trophy, USD350 & certificate for all members |
| **Merit award** | Trophy & certificate for all members |

- Public's choice award- certificate for all members. The award is to be decided by the public visiting the exhibition. Upon registering for the exhibition, each visitor will be given a voting sheet where they have to complete and drop into the voting box at the registration booth after visiting the SDC booths.

- Best presentation award- certificate for all members. The award will be decided by the panel of judges based on the presentation part of the judging criteria.

- Best poster award- certificate for all members. The award will be decided by the panel of judges based on the poster part of the judging criteria.

- Best prototype award- certificate for all members. The award will be decided by the panel of judges based on the prototype part of the judging criteria.

- Peer's choice award certificate for all members. 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 their own team. The votes have to be casted at the end of the presentation session.

# Author Index

# Supporting Organizations















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# 2014 i-CREATe

20th - 22nd AUGUST, Singapore

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