Editorial

February 2018 Newsletter 12

Welcome to the 12th issue of the ISVR newsletter. In this issue we highlight the work in the field of virtual rehabilitation at Hammel Neurorehabilitation Hospital and University Research Clinic (Dr. Iris Brunner, Denmark), and at the Virtual Reality-Augmented Rehabilitation Lab (Dr. Rachel Proffit, USA).

We also have an exciting start to 2018 after the recent elections for the board of directors of the ISVR. As the newly elected president of ISVR, I would like to express my gratitude to the outgoing president - Mindy Levin - and all of board members that ended their mandate - Kynan Eng, Emily Keshner, Belinda Lange, Assaf Dvorkin and Cali Fidopiastis - for their leadership and hard work in successfully building the Society over many years. The newsletter features profiles of the newly elected members of the ISVR board of directors - Amir Tal, Danielle Levac and W. Geoffrey Wright – and Christopher A. Rábago as the new vice-president of ISVR.

Also, in this issue Sue Cobb writes about the International Conference on Disability, Virtual Reality and Associated Technologies (ICDVRAT) Conference Series and the upcoming 12th edition held in collaboration with Interactive Technology and Games (ITAG) conference on 4-6 September 2018 at the University of Nottingham Nottingham, UK (http://www.nottingham.ac.uk/conference/fac-eng/icdvrat2018/index.aspx).

Finally, we continue to feature recent books, conferences and ISVR news. We are always looking for interesting contributions to the newsletter. If you would like to share your news, upcoming events or an overview of your research, lab, clinic or company, please contact us at newsletter@isvr.org.

Enjoy our newsletter and I hope to see you all this fall at the 12th ICDVRAT in September.

Sergi Bermúdez i Badia, ISVR President

IN THIS ISSUE

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UPCOMING EVENTS

ISPRM INNOVATION CONTEST
Deadline April 30
http://www.isprm2018.com/scientific-information/innovation-contest#.WnjdBahl_IV

12th International Society of Physical & Rehabilitation Medicine (ISPRM) World Congress
33rd Annual Congress of the French Society of Physical and Rehabilitation Medicine
July 8-12, 2018, Paris, France
http://www.isprm2018.com

12th International Conference on Disability Virtual Reality and Associated Technologies, In Collaboration with Interactive Technologies and Games
September 4-6, 2018 - Nottingham, England
http://www.icdvrat.org/

11th World Stroke Congress
October 17-20, 2018 - Montreal, Canada
http://www.world-stroke.org

Hammel Neurorehabilitation Hospital and University Research Clinic

Iris Brunner
Hammel and Skive, Denmark
http://www.hospitalsenhedmidt.dk/regionshospitalet-hammel/info-in-english/
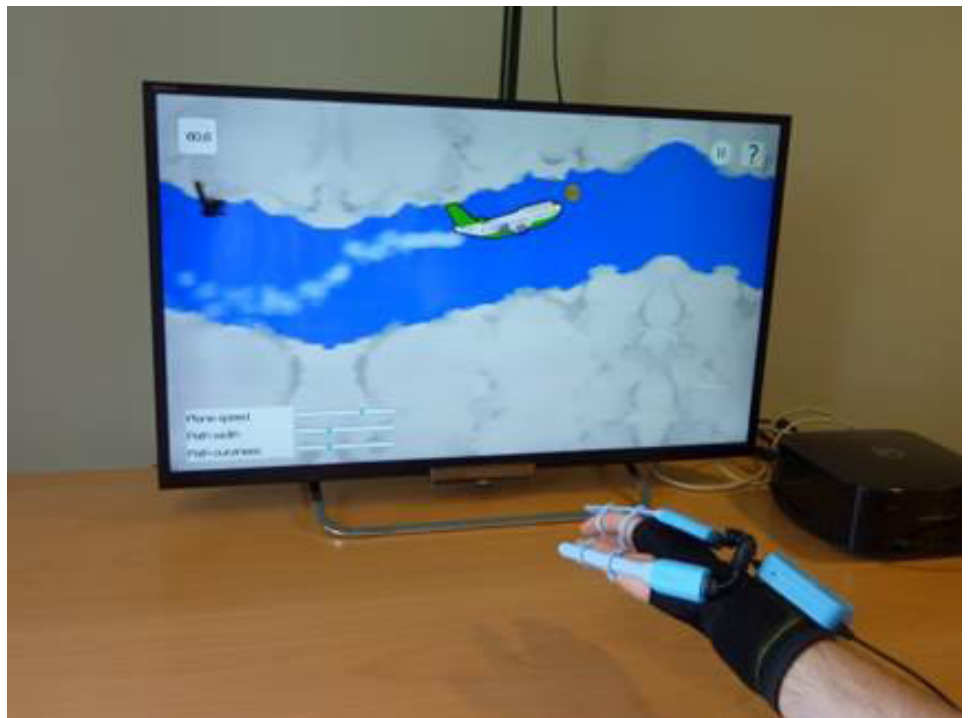
General Information

Hammel Neurocenter is a regional hospital and serves patients with acquired brain injuries, both adults and children. Diagnoses include stroke, traumatic brain injuries, brain tumors and Guillain-Barre. Patients with the need for comprehensive rehabilitation are referred from the entire Western Denmark region. Approximately 700 patients are admitted per year, the centre has 114 beds and around 620 employees. A multidisciplinary research unit is highly intergrated into clinical practice.

Where is your clinic located?

Hammel Neurorehabilitation Hospital and University Research Clinic is located in Hammel and in Skive, near Aarhus in Western Denmark.

You Grabber system for upper limb rehabilitation

What VR rehab system(s) do you have installed?

We use several systems that include VR and computer games. For upper limb rehabilitation, we have installed 2 Armeo Spring systems from Hocoma. These are exoskeletons that provide weight support and are used together with interactive games. We also use 2 You Grabber systems for upper limb rehabilitation. The YouGrabber (now Bi-Manu-Trainer) systems comprise gloves with sensors, an infrared camera that tracks the patients' movements and software with several rehabilitation games. Furthermore, several VR scenarios that are used with goggles called VRIAT (Virtual Reality Intensive Arm Training) have been developed in collaboration with the private company Kanda. For the prototype we use Oculus goggles combined with Kinect and Leap Motion sensors for patients with impaired arm motor function following stroke or traumatic brain injury. We are also developing a system for neglect assessment and rehabilitation in collaboration with Aalborg University using HTC Vive and eye tracking from Pupils lab. The system is aimed at detecting subtypes and severity of spatial neglect and attentional behavior and eventually also aimed at treatment. For lower limb rehabilitation, we use the Hocomas Lokomat with integrated VR. This robotic system is primarily integrated and used in clinical work with the more severely injured patients.

What benefits do you gain from using this VR rehab system?

The main benefit that most systems offer is the playful character of VR training. Patients can regard it at least partly as a game and not only a training session. This motivates them to train for a longer time and at a higher intensity in terms of repetitions. It is also an entertaining alternative to conventional physical and occupational therapy. VR may be especially relevant for severely impaired patients, e.g. patients who have very little active movement in their affected upper limb after stroke. Here, VR can be used to translate even minute movements into something meaningful on a screen. Thereby, patients experience that they actually can do something with their arm and the brain receives feedback to the motor output, which again can increase motor function. Additionally, there are potential benefits from the data generated and collected through the interaction between patient and VR system, which can be used in clinical assessment and for research purposes.

User experiencing Virtual Reality Intensive Arm Training

What problems did/do you have with using these systems?

Technical problems are always a part of using and especially of developing VR systems. With any of the systems we use, we experienced some difficulties, such as incorrect tracking of movements and freezing. We also experienced problems with the limited degree of movement in especially shoulder extension and elbow flexion of the Armeo. For commercially available devices, good customer support is crucial. In general, these difficulties can be solved and do not compromise the use of VR substantially. Still VR solutions require some skills in setting them up. Goggles, such as Oculus and Vive still have cables connecting them to the computer, which can limit the use of the system and interfere with the patients' movements. Dedicated therapists with a genuine interest in technology-assisted rehabilitation also make the frequent use of VR systems more likely.

Are you involved in clinical research using VR rehab systems? If so, please describe briefly.

Hammel Neurocenter as a University Reseach Clinic is involved in different technology-related projects. Hammel Neurocenter was part of the Virtual Reality for Upper Extremity in Subacute stroke (VIRTUES) trial. In this trial, VR training provided with the YouGrabber (now Bi-Manu-Trainer) was compared to conventional physical and occupational therapy, both given as an add-on to standard rehabilitation. Other projects comprise testing the usability and validity of the VR system for assessing and treating spatial neglect and the further development of VR for upper limb training.

What do you see as the most important challenge for VR rehab research and development?

VR development should target exact and smooth tracking, user-friendliness and simple, high-definition graphics.

Furthermore, haptic and tactile features to make the experience more real. A storyline and different levels that can be reached like in commercial computer games, could also make the experience more attractive. Research could focus on defining subgroups of patients, what works for whom at what point in time after the lesion? In other words, developing a system that individualizes the treatment to every single patient's impairments and adjusting the treatment from session to session even within sessions. In the subacute phase, most plasticity can be expected and most patients receive some kind of rehabilitation. At the same time, it is very difficult to demonstrate the effect of a single approach in the context of spontaneous recovery and other rehabilitation. Therefore, large multicenter studies are needed. A central field of application will be home-training with VR. Systems connecting several users who can compete with each other could be very motivating, hence increasing the intensity of home-based tele-rehabilitation.

Virtual Reality-Augmented Rehabilitation Lab

Rachel Proffit
Missouri, USA
https://healthprofessions.missouri.edu/proffitt-vr-ar-lab/

Where is your lab located?

The Virtual Reality-Augmented Rehabilitation Lab is located in the Department of Occupational Therapy at the University of Missouri.

What patient populations do you serve? How many per year?

My research serves a variety of adult patients including those with chronic stroke, traumatic brain injury, spinal cord injury, Parkinson's Disease, amputations, burns, and progressive neurological conditions (eg., ALS). Research studies vary in size from single case studies to larger pilot trials of 20-30 participants.

What VR rehab system(s) do you have installed?

I currently utilize a number of systems and technologies. My primary research studies are exploring the feasibility and preliminary efficacy of a Kinect®-based customized rehabilitation system called Mystic Isle. This was developed by a multi-disciplinary team (myself included) at the Institute for Creative Technologies at the University of Southern California. We have a second version of the software that pairs Mystic Isle with the Oculus Rift®. I am currently exploring the safety and feasibility of this pairing with people with stroke. I am also partnering with commercial companies and am currently investigating the feasibility of using the Neofect Rapael SmartGlove in our Department's student-run, no fee adult rehabilitation clinic called TigerOT. We

now have a well-established train-the-trainer model in place that facilitates knowledge translation.

What benefits do you gain from using this VR rehab system?

We see that clients choose to engage more in their rehabilitation program, both in the clinic and in the home. This increased motivation to "get up and move" spills over into everyday life. I find that clients report engaging, or reengaging, in valued everyday activities such as cooking, playing with grandchildren, or caring for a pet. Other report changes in mood such as reduced levels of anxiety and depression and dramatic reductions in pain levels. From a clinical standpoint, we have now validated the use of the
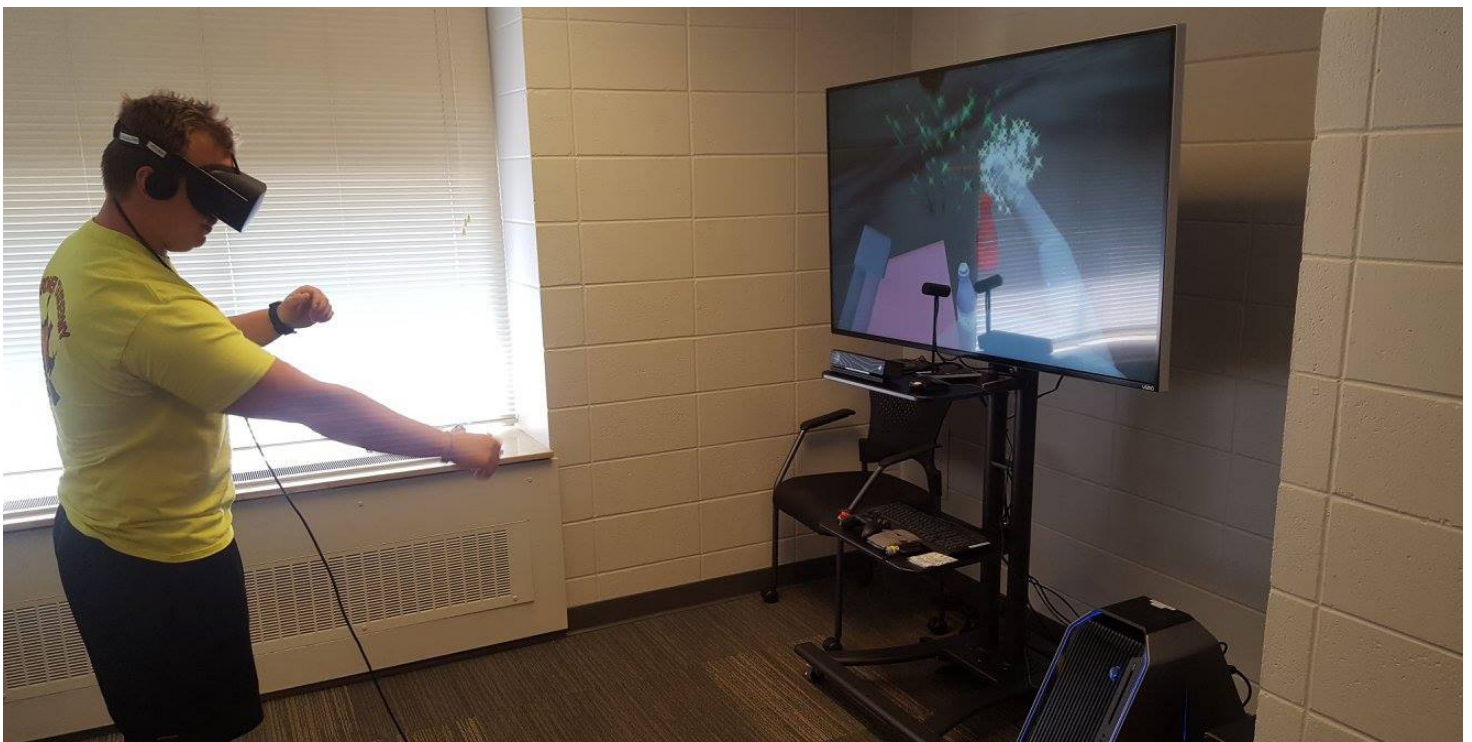
User interacting with Mystic Isle

(continued from page 4)

Kinect® V2 as a an assessment tool for rehabilitation. The skeletal tracking capabilities are highly valid and reliable when compared to our gold standards in the field. The amount and quality of data that these systems provide are vastly beyond what we can record and measure using our current clinical tools. The potential for documenting and demonstrating patient progress is nearly limitless.

What problems did/do you have with using these systems?

The biggest challenge for any researcher in this area is the rapid pace of technology development. Microsoft has now stopped producing the Kinect® so we are exploring other camera/sensor options in order to continue our research. Additionally, I recognize as a clinician that not every system is appropriate for every patient. The process for selecting appropriate interventions that are VR-based is no different that selecting any other intervention, high-tech or not. Sometimes patients express an interest but we quickly realize that a VR system is not appropriate or will not provide much benefit. That is often a difficult conversation to have with the patient and their family.

Neofect Rapael SmartGlove

What do you see as the most important challenge for VR rehab research and development?

Funding. Plain and simple. Reviewers at various funding agencies are becoming much more stringent in their reviews and researchers must demonstrate that the innovativeness and significance of their research is beyond what is currently available and being researched. I also think that the field of VR for rehabilitation has become over-saturated with devices and products that have been under-researched and have minimal data to support the efficacy and effectiveness in clinical practice. It is imperative that clinicians take the time to research a system BEFORE purchasing and using in clinical practice.

RECENT BOOKS ON VIRTUAL REHABILITATION
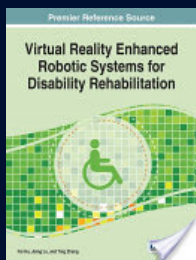
Virtual Reality Enhanced Robotic Systems for Disability Rehabilitation
Hu, Fei, IGI Global, January, 2016
https://tbirehabilitation.wordpress.com/2017/10/03/book-virtual-reality-enhanced-robotic-systems-for-disability-rehabilitation-google-books/?fb_action_ids=2376628379229170&fb_action_types=news.publishes.

The study of technology and its implications in the medical field has become an increasingly crucial area of research. By integrating technological innovations into clinical practices, patients can receive improved diagnoses and treatments, as well as faster and safer recoveries.

Virtual Reality Enhanced Robotic Systems for Disability Rehabilitation is an authoritative reference source for the latest scholarly research on the use of computer-assisted rehabilitation methods for disabled patients. Highlighting the application of robots, sensors, and virtual environments, this book is ideally designed for graduate students, engineers, technicians, and company administrators interested in the incorporation of auto-training methods in patient recovery.

NEW MEMBERS OF ISVR BOARD OF DIRECTORS

Amir Tal, PhD (Israel) - Dr. Tal has over the past 13 years been promoting research, policy and community based programs aimed to increase life opportunities, social inclusion and human rights of people with disabilities. Currently, Dr. Tal is serving as the chief scientist at Beit Ekstein from Danel Group. Beit Ekstein is the largest organization in Israel that provides person-centered housing, employment and placement and education services for people with disabilities, including people with Intellectual disabilities, Cognitive disabilities, Autism Spectrum Disorders, Down syndrome, Physical disabilities and Mental Health conditions. His research interests span the following areas: quality of life of people with disabilities, digital health, inclusive employment, inclusive education and assistive technology. Dr. Tal serves as editorial board member and as a reviewer in several peer-review journals. Recently, Dr. Tal co-edited with Dr. John Torous, a special issue at Psychiatric Rehabilitation Journal entitled: Digital and Mobile Mental Health.

Dr. **Christopher A. Rábago** is a Research Physical Therapist with the Extremity Trauma and Amputation Center of Excellence at the Center for the Intrepid in San Antonio, TX USA. He earned a PhD in biomedical engineering while at the University of Texas Health Science Center at San Antonio where he also received a Masters in Physical Therapy. He also holds a Masters in Biomechanics from the University of Texas at Austin. He is a practicing physical therapist and researcher in the Military Performance Laboratory at the Center for the Intrepid where a majority of his patient referrals are for biomechanical motion analyses and virtual reality based interventions. He is a lead investigator on multiple funded projects ranging from the evaluation of novel prosthetic devices to the development of Virtual Reality-based and Serious Game-based treatment interventions; all with the goal of returning injured service members to their highest level of functioning. He is also an adjunct professor at the U.S. Army-Baylor University Doctoral Program in Physical Therapy and the University of Texas Health Science Center Medical School.

Danielle Levac is a physical therapist and Assistant Professor in the Department of Physical Therapy, Movement and Rehabilitation Sciences, with an affiliate position in the Department of Bioengineering, at Northeastern University in Boston, MA. She directs the Rehabilitation Games and Virtual Reality Laboratory, where her research and scholarship focuses on the sustainable, evidence-based integration of virtual reality (VR) and active video games into rehabilitation practice. A main goal of her research program is to explore the 'active ingredients' of practice in virtual environments for motor learning and transfer in children and adults with neuromotor impairments. She uses motor learning paradigms in a variety of virtual environments to understand how task practice conditions impact motor learning processes and outcomes. Additionally, she works with therapists to develop, evaluate and translate knowledge about evidence-based tools and resources supporting VR/AVG clinical decision-making skills.

Dr. **W. Geoffrey Wright** has been actively using virtual reality to study the human perceptual and motor processes since the mid-90's. In 2008, he was introduced to the community of researchers and clinicians focused on using VR in clinically-oriented applications. He attended his first ICVR in 2009 in Haifa, Israel , and since then has attended every meeting. He has been a member of the ICVR Steering Committee since 2012 and in addition to attending ISVR meetings and began taking an active role in the organization of these conferences starting in Philadelphia (ICVR2012, local organizing committee, program co-chair for student submissions, awards committee), in Valencia (ICVR2014, Program Co-chair), and in Montreal (ICVR2016, Program Co-chair). He has also been involved in ISVR for many years as a member and serving on the awards committee. Dr. Wright's VR-related research program primarily utilizes head-mounted display (HMD) technology to study how visual, vestibular, and somatosensory inputs interact to guide perceptuomotor, postural, and locomotor processes. He investigates both healthy and neurologically impaired/diseased populations; the latter groups include traumatic brain injury, Parkinson's disease, vestibular disorders, and PTSD. As an ISVR board member, he hopes to bring his experience to the greater clinical research community by getting involved in the promotion and advancement of the society and increasing collaboration among the various entities who share a common goal of virtual rehabilitation.

ISVR Society News

The website at http://www.isvr.org acts as a portal for information about the society. We are keen to to enhance the community aspects of the site as well as to to make it the first port of call for people wanting to know what is going on in the field of virtual rehabilitation and its associated technologies and disciplines. Please do visit the site and let us know details of any upcoming events or conferences or news items you would like us to feature on the site. We intend to add further features in the coming year including member profiles; a directory of journals who publish virtual rehabilitation related work; and a list of Masters and PhD level theses completed or currently being undertaken in the field. As well as sending us details of events and news for display, we would welcome suggestions from members about what else they would like to see on the site, or ideas for how we can further develop the virtual rehabilitation community through it.

Please mail webdec@isvr.org with any information/ideas using ISVR INFO in the subject header.

Membership information

Membership of ISVR is open to all qualified individual persons, organizations, or other entities interested in the field of virtual rehabilitation and/or tele-rehabilitation. Membership (regular, student or clinician) entitles the member to receive reduced registrations at ISVR sponsored conferences and affiliated meetings (see webpages for more details). There is also an active ISVR facebook page, which is another source of useful information, currently with 1148 members.

Call for Contributed Articles

- If you are a technology expert in virtual rehabilitation or you have experience in the clinical use of virtual rehabilitation technologies, and would like to be featured in an upcoming ISVR newsletter issue
- If you would like to submit a contributed article relevant to the ISVR community
- If you have any news, summaries of recent conferences or events, announcements, upcoming events or publications

We are looking forward to your contribution! Please contact us at newsletter@isvr.org.

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ICDVRAT 2018

Sue Cobb, Penny Standen and David Brown
University of Nottingham and
Nottingham Trent University, UK
ICDVRAT 2018 chairs

The ICDVRAT Conference Series provides a forum for international experts and researchers to present and review how advances in the general area of virtual reality can be used in the area of disabilities, rehabilitation and education.

The ICDVRAT conference series was initiated by Paul Sharkey, University of Reading UK and started in 1996 as the European Conference on Disability, Virtual Reality and Associated Technologies held in Maidenhead, UK. Aspiring researchers in this new research field were inspired by three Keynote Addresses: Dr Harry Murphy, Director of the Centre on Disabilities, California State University, Northridge (CSUN) described early applications of 'virtuality' for 'Persons with Disabilities' with examples on the fields of movement disorder, anxiety, and the treatment of injury [1]; Professor David Rose, Head of the Department of Psychology, University of East London, presented a vision of how virtual reality could be used in neurological rehabilitation [2]; and Mr. Arthur Zwern, President of General Reality Company, described the 'Virtual Computer Monitor' (VCM), a novel system to enable visually impaired computer users to navigate about a computer screen using a head-mounted display interface [3]. 27 papers were presented at the 1996 conference representing emerging research in the wide range of applications of VR to health and disability.

The second ECDVRAT conference was held in Skövde, Sweden (1998), establishing the biennial conference cycle. The first of the session papers was presented by a user group of pupils with intellectual disabilities from the Shepherd School in Nottingham, UK describing their involvement in the design of a suite of virtual environments developed to help them to practice everyday living skills [4]. In 2000 the conference title changed from 'European' to 'International' reflecting the global reach of contributors and delegates. In 2006, the conference celebrated its 10-year anniversary with a review of the series to date [5] and its first conference collaboration. Held in Esberg, Denmark, the conference was run jointly with the first ArtAbilitation conference celebrating inclusive access to music and art, a partnership that was revisited in 2008 in Maia, Portugal.

The largest conference was held in Laval, France in 2012 which had 49 full paper presentations and was the first conference to include short-paper poster presentations. The 20-year anniversary of the conference series was held in Los Angeles, USA (2016), co-chaired by Albert 'Skip' Rizzo, a long-standing contributor to the ICDVRAT community and pioneer in the application of virtual technologies for cognitive assessment and therapy, notably in treatment of PTSD. This conference hosted the invited presentation from the recipient of the inaugural ISVR Early Career Award: Mónica Cameirão on 'Insights from 10 years of stroke virtual rehabilitation' [6].

The 2016 conference was also marked by the retirement of its founder, Paul Sharkey. Paul (co)-chaired 11 conferences held in 10 countries with more than 400 full paper presentations given by delegates from 35 countries. Paul also established a wonderful resource in the full ICDVRAT archive, with all papers 1996-2016 which is available at www.icdvrat.org/archive.htm and the papers from the 2018 conference will be added to this archive. Over this time Paul has brought together a research community of more than 1,000 members with a range of interests in the application of virtual reality and its associated technologies for beneficial use in assessment, treatment and support of individuals with disability, impairment or support needs. We take this opportunity to thank Paul for establishing this strong international research community and showing us the importance of an inclusive approach to technology development. As responsibility for the conference series passes into the hands of its members, we hope that we will continue to develop in the direction of Paul's vision and to support a research field constantly evolving with the emergence of new technology.

The ethos of ICDVRAT has always been one of inclusion; providing a forum for discussion and sharing of ideas and innovations between technology developers, clinicians, research scientists and end users. A strong feature of many of the papers presented over the conference series has been the involvement of user stakeholders in the design and evaluation of new technologies and applications providing user assistive technology and applications for learning, rehabilitation, therapy and clinical assessment to a broad range of users.

In 2018 we are delighted to announce a special theme of 'user involvement in research'. In celebration of 20-years since the Nottingham pupils presented at the ECDVRAT conference in Skövde, our first Keynote presentation will be given by the NICER user group, including some members who attended and presented at the 1998 conference in Sweden. NICER (Nottingham International Consortium on Educational Research) is a group of people with intellectual disabilities who are interested in research and want to make sure that research about intellectual disabilities conducted locally involves people with intellectual disabilities and is informed by their needs and wishes. The group started in 1995 when they took part in a project funded by the European Lifelong Learning Scheme. Since then they have met regularly to review research proposals that involve people with intellectual disabilities and advise on research projects that are running. This includes, for example, writing information sheets, designing pilot work, advising on recruitment

(continued from page 8)

and dissemination, testing software and advising on accessibility. NICER members have presented at several other international conferences including three International Association for the Scientific Study of Intellectual Disabilities (IASSID) meetings in Seattle (2000), Montpelier (2004) and South Africa (2008). The group also teach on masters courses in education at the University of Nottingham and Nottingham Trent University.

In 2018, ICDVRAT will be held in conjunction with Interactive Technology and Games (ITAG) hosted by Nottingham Trent University biennially in Nottingham and focuses on the use of gaming hardware and software, new input/output devices and the increasing impact of ubiquitous computing on health and education.

ITAG was established in 2008 with the express aim to bring together academics and practitioners working with games and associated technologies to explore and innovate within the areas of Education, Health and Disability. We have enjoyed a particular focus on the use of gaming hardware and software to implement accessible solutions, interaction design using new input/output devices and the increasing impact of ubiquitous computing on our everyday well-being.

Presentations have covered a wide area of topics but have traditionally included Games Based Learning, Serious Games for Education and Health, Hardware Development for Serious Games, and Virtual Environments for Health and the Psychology of Games.

Up until 2016 ITAG was run as an annual conference in collaboration with the GameCity Festival held annually in Nottingham. After our 2016 conference (our ninth annual event) we moved to become a biennial conference and are delighted to kick off this new chapter in our development by collaborating with ICDVRAT18. Even though we have historically held events that were designed to attract both academic and user communities (teachers, clinicians, end users themselves) we have still attracted international visitors from all around the globe.

ITAG has encompassed both traditional and not so traditional events within its usual two-day programme. We have held keynote addresses at each event, and in 2015 for instance these were given by Kevin Durkin, Professor of Psychology at University of Strathclyde and Stephen Howell, Academic Engagement Manager at Microsoft.

We have used location-based games to find meeting places in local pubs (not so hard to find in a city with as many pubs as Nottingham!). Hackathons have been a regular feature – including team consisting of students working directly with people with a range of cognitive, sensory and physical impairments to co-create technology based solutions. Prizes have attracted teams as far away as Denmark and all delegates get a chance to vote on the winners of these competitions.

We have particularly welcomed student talks and offered prizes for the best student paper. More latterly we have held "community-practitioner" afternoons, where invited community leaders have demonstrated the ongoing, real-world impact of academic research and identified key opportunities and challenges they have faced. We hope that these sessions have inspired, engaged and informed attendees and led to new partnerships, further ongoing collaborative research, and a greater understanding of the practical requirements and current challenges faced by local community groups with responsibility for service provision in the areas of Health, Education and Disability.

So we look forward enthusiastically to the next chapter in our evolution – starting with our 2018 conference held in conjunction with ICDVRAT and relish the opportunities this will create.

ISVR sponsors the Best Student Paper and Best Student Short Paper at ICDVRAT.

Discounted registration rates are available to ISVR Members.

[1] H. J. Murphy. Virtual reality and persons with disabilities. Proc. 1st European Conference on Disability, Virtual Reality and Associated Technologies, P. M. Sharkey (Ed.), pp 3-4, Maidenhead, UK, ISBN. 070491140X, July 8–10, 1996.

[2] F. D. Rose. Virtual reality in rehabilitation following traumatic brain injury. Proc. 1st European Conference on Disability, Virtual Reality and Associated Technologies, P. M. Sharkey (Ed.), pp 5-12, Maidenhead, UK, ISBN. 070491140X, July 8–10, 1996.

[3] A. L. Zwern and G. L. Goodrich. Virtual computer monitor for visually-impaired users. Proc. 1st European Conference on Disability, Virtual Reality and Associated Technologies, P. M. Sharkey (Ed.), pp 13-21, Maidenhead, UK, ISBN. 070491140X, July 8–10, 1996.

[4] L. Meakin, L. Wilkins, C. Gent, S. Brown, D. Moreledge, C. Gretton, M. Carlisle, C. McClean, J. Scott, J. Constance and A. Mallett. User group involvement in the development of a virtual city. Proc. 2nd European Conference on Disability, Virtual Reality and Associated Technologies, P. M. Sharkey, F. D. Rose, J.-I. Lindström (Eds), pp 1-9, Mount Billingen, Skövde, Sweden, ISBN. 0704911418, Sept. 10–11, 1998.

[5] S.V.G. Cobb and P.M. Sharkey. A decade of research and development in disability, virtual reality and associated technologies: review of ICDVRAT 1996-2006. International Journal of Virtual Reality, 6 (2), 51-68, 2007.

[6] M.S. Cameirão. Insights form 10 years of stroke virtual rehabilitation – a personal perspective. Proc. 11th Intl Conf. on Disability, Virtual Reality and Associated Technologies, P. M. Sharkey, A.a. Rizzo (Eds), pp 9-10, Los Angeles, California, USA, 20-22 Sept. 2016.

12TH International Conference on Disability, Virtual Reality and Associated Technologies (ICDVRAT) in collaboration with Interactive Technology and Games (ITAG)

Conference Dates: 4-6 September 2018
University of Nottingham

Nottingham, UK
www.nottingham.ac.uk/go/icdvrat2018

The ICDVRAT Conference Series provides a forum for international experts and researchers to present and review how advances in the general area of virtual reality can be used in the area of disabilities, rehabilitation and education.

ICDVRAT - ITAG 2018 Call for papers

The ICDVRAT Conference Series provides a forum for international experts and researchers to present and review how advances in the general area of virtual reality can be used in the area of disabilities, rehabilitation and education.

High quality papers are sought in which technical innovation is backed up by evidence of original and practical implementation, or which promise practical implementation in the very near future. The research presented at the conference will be published in a peer reviewed proceedings

Conference topics include, but are not restricted to:

Virtual and enhanced environments	Physical Rehabilitation	Clinical assessment
Cognitive Rehabilitation	Communication and language	Input Devices
Remote/TelecareGame based learning	Input Devices	Remote/TelecareGame based learning
VR for Health	Sensory Impairment	Mobile health applications
Robotics and education	Mobile health applications	Robotics and education
Communication aids	Communication aids	Tools for architectural/CAD design
Product design testing and prototyping	Tools for architectural/CAD design	
	Rehabilitation robotics	

Deadlines

Full Paper

Submission of Full Paper (6-8 pages)	28th February 2018
Notification of acceptance	15th May 2018
Submission of Final Paper	15th June 2018

Submissions that are not accepted as Full Papers may be considered for inclusion as Short Papers.

Short Paper

Submission of Short Paper (2-4 pages)	31st May 2018
Notification of Acceptance	20th June 2018
Submission of Final Short Paper	1st July 2018