

ISVR

# NEWSLETTER

NUMBER 17 | MAR 2020

## Editorial

### March 2020 Newsletter 17

In this issue, we cover some extensive and exciting work in the fields of VR rehabilitation for mental health, cognition and pediatrics.

We introduce you to the clinical work and research done in different departments of the ALYN Hospital in Jerusalem. First, Osnat Arbel, introduces us to the Virtual Reality Treatment Room and how they exploit off the shelf and custom-made VR systems in the Occupational Therapy department, page 2. Then, Simon H. Schless presents the Movement Analysis and Biofeedback laboratory, which implements training protocols with VR and with biofeedback for cerebral palsy, spina bifida, traumatic, brain injury, osteosarcoma, and other conditions, page 3. Hilla Boral, introduces us to PELE Tailor-Made Solutions for Children, page 5. Finally, Naomi Gefen describes the modified version of the McGill Immersive Wheelchair Simulator (MiWe-C) being used at ALYN, page 7.

Also, in this issue, Dr. Michael Gaebler from the Max Planck Institute for Human Cognitive & Brain Sciences in Leipzig describes the project "Virtual worlds for digital diagnostics and cognitive rehabilitation" that supports the diagnosis and rehabilitation of cognitive impairments, see page 9.

Finally, Professor John Torous from Beth Israel Deaconess Medical Center at Harvard Medical School in Boston introduces the mindLAMP platform - smartphones as a means of monitoring, treatment, and research of psychiatric and mental health conditions, page 11.

I would like to call your attention and also invite you to join us at the upcoming ISVR sponsored conference, the 13th International Conference on Disability, Virtual Reality & Associated Technologies, that will take place from September 9th to 11th in the beautiful town of Serpa, Portugal (<http://icdvrat2020.ulusofona.pt>)

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](mailto:newsletter@isvr.org).

I hope all our readers stay healthy in these difficult times.

*Sergi Bermúdez i Badia, ISVR president*

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## UPCOMING EVENTS

**European Stroke Organisation and World Stroke Organization Conference (ESO-WSO 2020)**  
Postponed to November 7-9, 2020  
Vienna, Austria  
<https://eso-wso-conference.org>

**Rehabilitation World Congress**  
September 8-10, 2020  
Aarhus, Denmark  
<https://www.rworldcongress2020.com/>

**13th International Conference on Disability, Virtual Reality & Associated Technologies**  
September 9-11, 2020  
Serpa, Portugal  
<http://icdvrat2020.ulusofona.pt/>

**11th World Congress for Neurorehabilitation**  
October 7-10, 2020  
Lyon, France  
<https://www.wcnr-congress.org/>

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## Virtual Reality Treatment Room at ALYN Hospital

### Osnat Arbel, BOT, MS Ed.

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Virtual reality (VR) is a unique tool used for assessment and intervention in pediatric rehabilitation that is motivating, fun and challenging, and can be tailored to the individual's needs and abilities. VR technology enables people with disabilities to experiment with a variety of games that simulate virtual activities. The tasks involved in the performance of VR games in a rehabilitation setting can be used to target goals such as improving strength, endurance, balance, range of motion, and the speed and accuracy of the users' movements. VR therapeutic systems can also record the data from the patients' sessions providing a means to track their progress.

The Depts. of Occupational Therapy and Physical Therapy at ALYN have incorporated treatments using the Wii and Xbox systems for a number of years. More recently, a virtual reality room has been allocated to provide access to seven different VR systems that include commercial off-the-shelf VR games as well as complex systems developed for use in rehabilitation centers for both individual treatment and group interactions. These systems include Microsoft's Xbox, Sony's PlayStation, a floor mat (OMI Projection System, [www.oki.uk](http://www.oki.uk)), a touch table (Funky Touch, [www.playzone.co.il](http://www.playzone.co.il)), the VAST

rehabilitation system (<https://vast.rehab/>) operated with a Kinect sensor, the Tyromotion's TYMO rehabilitation system (<https://tyromotion.com/en/products/tymo/>), and the SenSerum immersive VR system ([senserum.com](http://senserum.com)) which incorporates the use of an HTC VIVE Head-mounted display.

Our challenge at ALYN is to make these systems accessible for children with very complex disabilities who lack the ability to operate the games through the standard use of the game controllers. For example, the Xbox system has been adapted through the use of external switches to operate the game controller. The room has been active for almost a year, during which time the clinical staff has been learning how to use these systems. The children respond positively and enjoy the treatments provided there. The room is used part of the week (2/5 days) by 25% of the OT staff and 10% of the PT staff. We have encountered several issues that need to be addressed in order to facilitate greater use of this treatment option. For example, setting up the systems is a challenge for the staff when their treatment time is limited, therefore a dedicated staff member now sets up and solves technical problems when they occur. An additional challenge is the willingness of the staff to adopt



Child using VAST

and implement new technologies. This was overcome by appointing technology champions that took upon themselves the responsibility to learn the programs and teach other staff.

We are in the process of planning studies to examine how these systems can benefit the advancement of treatment goals, compare between the different systems, and provide an in-depth examination of the unique contribution of using virtual reality systems as a leisure activity to enhance the quality of life and participation of the inpatient pediatric population.

## Movement Analysis and Biofeedback laboratory at ALYN Hospital

### Simon H Schless

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### Where is your clinic / research institution located?

The Movement Analysis and Biofeedback laboratory is located in the ALYN Hospital Pediatric and Adolescent Rehabilitation Center in Jerusalem. ALYN Hospital specializes in pediatric rehabilitation, treating a broad spectrum of common and rare pathologies. More information about ALYN Hospital can be found at <https://www.alyn.org/>.

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

In our first year of using the Movement Analysis and Biofeedback laboratory (Jan 2019 – Jan 2020), we performed over 150 clinical gait analyses and 16 biofeedback training protocols, all with virtual reality visual stimuli. Common patient populations include cerebral palsy, spina bifida, traumatic brain injury, osteosarcoma, and other orthopedic diagnoses.

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

We are using Motekforce Link's Gait Realtime Analysis Interactive Lab (GRAIL) (<https://www.motekmedical.com/product/grail/>) virtual reality (VR) system. It is configured with 10 optical motion tracking cameras (Vicon®, UK), a 16 channel wireless surface electromyography system (Delsys®, USA) and an instrumented split-belt treadmill with four degrees of freedom (pitch and medial/lateral translations) and two embedded force plates. In front of the treadmill



A patient with an orthopaedic condition of the hip, working on improving gait symmetry via a split-belt training protocol.

is a 180° curved screen that together with a projection on to the treadmill itself and a surround sound system, provide an immersive environment. We have found this to be particularly crucial for motivating younger patient populations, and to avoid the feeling of repetitiveness or boredom during treatment.

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

The VR system is designed to support daily clinical use. It enables real-time calculation of synchronised joint kinematics, kinetics and muscle activity during gait, greatly reducing the usually lengthy post-processing time. Visual engagement from the various projected environments appears to evoke a more natural walking pattern when combined

with a constantly adapting self-paced algorithm that accommodates children's natural variability in walking speed. We collect large quantities of gait cycles for analysis (50 per leg), further improving the overall accuracy and enhancing clinical interpretation. Our biofeedback training protocols consist of six to twelve sessions over a short period of time. Objectives range from targeting normalisation of gait via visual and auditory feedback to dual-tasking and perturbation training to prepare a patient for reintegration into their activities of daily life.

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

Clinical research is very important to us at ALYN Hospital. We are currently using an application whereby a

# CLINICAL PROFILE

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three-dimensional avatar based on a livestream of the patient's joint kinematics is projected on to the screen in front of them. While sitting, standing and walking the patient receives immediate visual and auditory feedback in accordance with specific training aims. Currently we have an ongoing project for patients with orthopedic pathologies. These populations were chosen as their impairments appear to stem from pain avoidance and muscle weakness in the early stages of their rehabilitation, but persist long after the pain decreases and muscles strengthen. We have found that just twelve repetitive training sessions (three times per week for a month) on a single task, such as reducing a Trendelenburg gait pattern, can be much more effective with the use of VR. This was also supported by patient reports of satisfaction with treatment; in particular, they appreciate the ability to see how they are walking over an extended period of time, and to learn how to adapt that pattern.

## What do you see as the most important challenge



Coronal images of a patient prior to initiating her VR gait biofeedback training, and immediately after her fourth training session. The vertical dotted black line is placed to help emphasise the reduction in ipsilateral trunk lean.

## for VR rehab research and development?

From our experience there are three challenges of integrating VR into the

pediatric rehabilitation setting that need to be explored further. The first relates to the duration of each VR training session. Currently, each session lasts for 45 minutes based on a combination of what is clinically feasible and not overly demanding for our young patients. The second is related to the quantity of VR training sessions. The decision to implement protocols of six to twelve sessions is a compromise between sufficient repetition in the desired VR training and burnout of patient motivation. Even though we see immediate positive effects from the VR training, the overall combination of training duration and intensity, and how that influences the long-term transfer into real world ability remains to be further explored. The third is related to the age of the patients, in particular the development of engaging and clinically relevant VR training for younger children ages 4-7.



A patient with a traumatic brain injury, working on balance and stability by walking on a rope bridge, incorporating incline, decline and medio/lateral perturbations of the treadmill.

## PELE Tailor-Made Solutions for Children

**Hilla Boral, BOT, MSc Ed**  
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Assistive technology (AT) is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is commonly used to increase, maintain, or improve functional capabilities of individuals with disabilities."<sup>1</sup> People with disabilities often face difficulties in carrying out daily life functions, learning, communicating, working and participating in leisure activities. The availability of well-designed and adapted AT makes it possible to reduce the effects of occupational performance limitations on everyday life activities by facilitating and enhancing school and work performance and social interactions. This significantly contributes to the individual's participation, self-esteem and quality of life.

Regrettably, off-the-shelf AT is often not suitable for a given person with needs. It is often very expensive, not designed specifically for children or for children with complex physical disabilities, or not available locally.

PELE<sup>2</sup>SolutionsforChildrenaddresses these limitations via a case-driven approach that focuses on creating

adaptable, adjustable, accessible, and affordable personalized solutions for children who face physical challenges so that they can achieve greater independence in their day-to-day activities including eating, dressing, maintaining personal hygiene, communicating, studying and being mobile. The interdisciplinary PELE team provides consulting services, guidance, and the design and manufacturing of assistive technologies by volunteer "makers" to produce adaptable, adjustable, accessible and affordable innovative AT solutions. It is funded by the Israel National Insurance Agency as well as private donations.

As PELE seeks to help individual children solve specific problems that typically do not have an off-the-shelf solution, the team recently helped a 13-year-old boy without the full use of his arms to don phylacteries ("tefillin" in Hebrew, holy straps worn by observant Jews for prayer) on his head for his Bar Mitzvah (Fig. 1). The PELE team designed and fabricated a device that enabled the boy to put the tefillin up on his head simply by pulling on a string and bending his head down.



Figure 1- Bar Mitzvah boy putting phylacteries on.

Solutions include a wide range of AT for self-feeding and drinking such as a simple mechanical plate assembly to enable self-feeding by a child with severe motor limitations (Fig. 2), handles for a "Flexi Cup" (fig. 3), and a backpack (Fig. 4) or stroller bag (Fig. 5) for feeding equipment.



Figure 2- Self Feeding device



Figure 3 – Handles for a Flexi-Cup



Figure 4- Backpack for feeding equipment

<sup>1</sup> Assistive Technology Act, 2010. Pub. L. 108-364, Sec. 3

<sup>2</sup> in Hebrew means "pele" means "wonder," and is also a Hebrew acronym for Solutions for Children of ALYN), and ALYNnovation.

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Other devices are created to enable the use of personal accessories such as a customized cellphone holder (Fig. 6) and a tracheostomy speech valve holder (Fig. 7). A third category of devices are related to game and music usage. Examples include a "Lazy Susan" marker cap holder

(Fig. 8), a switch-operated bubble wand (Fig. 9) and hydrotherapy arm strengthening exercises (Fig. 10).

Pele continues to develop its services with the aim of responding to requests expediently and providing high quality products at the lowest

possible cost. Feedback from users, family members and professionals has been overwhelmingly positive. Nevertheless, we intend to continue to improve the service by conducting research and addressing changing needs and incorporating emerging technology.



Figure 5- Bag for stroller for feeding equipment

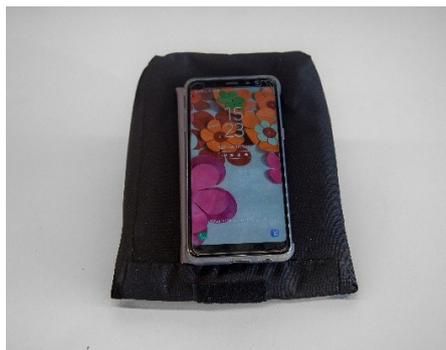


Figure 6- Cellular Phone Holder



Figure 7- Tracheostomy speech valve holder



Figure 8- "Lazy Susan" marker cap holder



Figure 9- Switch-operated bubble wand



Figure 10- Hydrotherapy arm strengthening exercises

# STUDY PROFILE

## Deputy Director General of ALYN Hospital Pediatric and Adolescent Rehabilitation Center

### Naomi Gefen

Occupational Therapist

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Naomi Gefen is an occupational therapist and the Deputy Director General of ALYN Hospital Pediatric and Adolescent Rehabilitation Center in Jerusalem, Israel. Naomi has 27 years of experience in assistive technology and medical devices. She holds a BA and MSc in Occupational Therapy from Hebrew University and a Master's Degree in Public Administration from the Harvard Kennedy School as a Wexner Israel Fellow (2008). Naomi specializes in assistive technology for children with disabilities and works together with the Ministry of Health to improve services for children with disabilities. She is a doctoral candidate at Haifa University, modifying and testing a simulator for powered wheelchairs for children with severe disabilities.

### Clinical research profile:

A modified version of the McGill Immersive Wheelchair Simulator (MiWe-C) is being used at ALYN Hospital in Jerusalem, Israel. The original MiWe was developed by Dr. Philippe Archambault's team at McGill University in Montreal and used for practice with adults learning powered mobility skills (<https://atrehab.ca/>). The modified version was translated into Hebrew, additional environments were added for research needs and children avatars were added.

### Where is the research being done?

The research is being performed at ALYN Hospital, a Pediatric and Adolescent Rehabilitation Center in Jerusalem, Israel. ALYN Hospital treats children with congenital and acquired physical disabilities from birth to adulthood where 300 children are seen daily. ALYN



(Top) Section of physical route and (bottom) comparable section of virtual route.

uses technology and assistive devices to facilitate independent function. The ALYN Equipment Display Center enables children and families access to different equipment to try out and decide what would best suit their children's' needs. As part of the center, ALYN has a lending program of powered wheelchairs for children to practice at home to become proficient drivers, and entitled for funding of their own powered wheelchair from the Israel Ministry of

Health. In addition to determining the benefits of simulator training compared to convention modes, this program has been helpful in reducing the waiting list for lending chairs.

### How is the MiWe-C being used in research?

The original research on the MiWe was performed on healthy adults for

# STUDY PROFILE

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feasibility, and adults with physical disabilities that were proficient in their driving skills for validity and reliability<sup>1</sup>. The first study at ALYN hospital assessed the validity of the MiWe-C<sup>2</sup>. Thirty proficient powered wheelchair drivers aged 5-18 years with physical disabilities were assessed by driving their own chair through a physical route in ALYN Hospital and by then driving the same virtual route via the MiWe-C. Their performance was compared using the Powered Mobility Program<sup>3</sup>. The scores for the total PMP score as rated during both simulator wheelchair driving and during physical driving were very high ( $M=4.90$ ,  $SD=0.20$ ;  $M=4.96$ ,  $SD=0.12$ , respectively) with no significant difference between them ( $z=-1.69$ ,  $p=0.09$ ). Results showed that the MiWe-C was valid to use with children. A second study, currently ongoing, is a single-center quasi randomized controlled intervention study, that compares the learning process of powered mobility of 40 children with physical disabilities over a period of three months. The control group practices powered mobility on a real chair whereas the experimental group practiced powered mobility via the MiWe-C simulator. To date, 27 children have completed the study.

## What benefits do you gain by using this system?

Powered mobility is a skill that children need to learn since it is unsafe for the children and others in the environment

until proficiency is obtained<sup>4</sup>. To become a proficient driver, intense practice time is needed but practice depends on having a chair to practice with and a staff or family member available to support the practice. Having a feasible and effective alternative to practice powered mobility skills in a safe manner is thus beneficial for all involved.

The MiWe-C provides a viable opportunity for children to practice sitting safely in front of the computer. Children can train specific skills that might need additional practice time (e.g. maneuvering a door). An additional advantage is the price; a powered wheelchair costs \$2000-\$8000 with an average of \$4000. The simulator program is free for download (with permission from Dr. Archambault) and is suitable for use on any home computer (desktop or laptop). The only cost is the adapted joystick, made from a Logitech Extreme 3D Pro and a Penny and Giles J200 (~\$260).

## What were your challenges in using the MiWe-C system?

The MiWe was adapted for use in Israel by translating the user interface and by adding two customized routes for research purposes. The modification of the program required working with Canadian company Illogika. Since the Hebrew language is written from right to left, there were technical challenges in adapting the English/French interface. In addition, the simulation program is only suitable to use with a joystick. This

eliminated the option for children that use switches or a scanner to drive a powered wheelchair.

## References

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2. Gefen, N., Rigbi, A., Archambault, P. S., & Weiss, P. L. (2019). Comparing children's driving abilities in physical and virtual environments. *Disability and Rehabilitation: Assistive Technology*, 1-8.
3. Furumasu, J., Guerette, P., & Tefft, D. (1996). The development of a powered wheelchair mobility program for young children. *Technology and Disability*, 5(1), 41-48.
4. Gefen, N., Rigbi, A., & Weiss, P. L. (2019). Predictive model of proficiency in powered mobility of children and young adults with motor impairments. *Developmental Medicine & Child Neurology*, 61(12), 1416-1422.

## Virtual worlds for digital diagnostics and cognitive rehabilitation

### Michael Gaebler, PhD, post doc researcher

MPI for Human Cognitive & Brain Sciences

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<http://www.vreha-project.com/>

### Where is your clinic / research institution located?

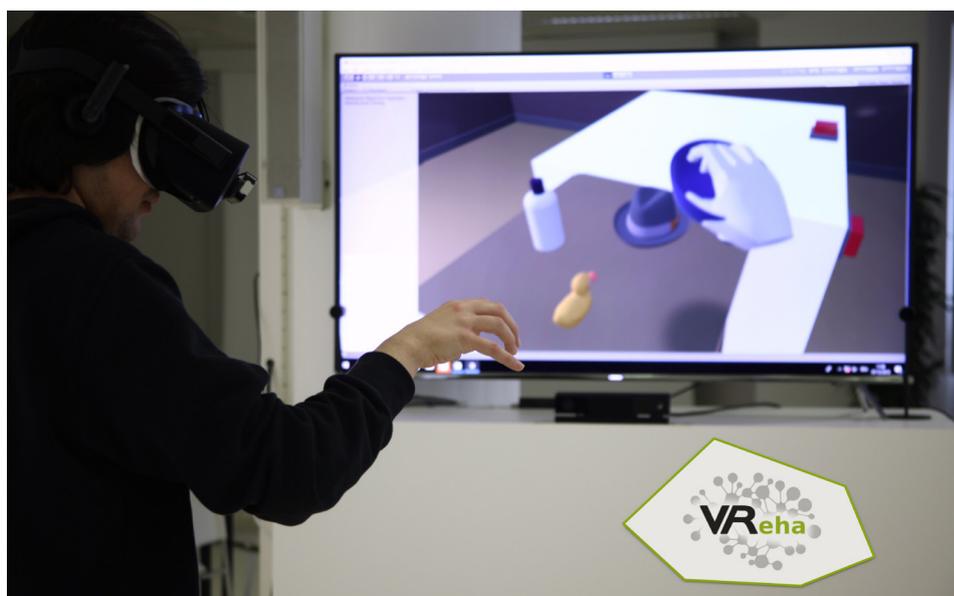
The project “Virtual worlds for digital diagnostics and cognitive rehabilitation” (VRaha) is funded by the German Federal Ministry of Education and Research. It comprises scientific (MPI Human Cognitive & Brain Sciences), technical (Fraunhofer HHI, HASOMED), and clinical partners (Charité - Universitätsmedizin Berlin; University of Leipzig) in Germany’s Northeast (Leipzig, Magdeburg, Berlin).

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

We develop immersive VR applications to support the diagnosis and rehabilitation of cognitive impairments. For the “immersive Virtual Memory Task” (see photo), with which one can test and train spatial memory, we’re currently establishing the feasibility in different groups of neurological patients (e.g., stroke and Alzheimer’s Disease).

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

Our setup consists of an Oculus Rift head-mounted display in combination with a depth-sensing camera (Leap Motion) to track the user’s hands. In addition, we are currently porting our toolbox to the Oculus Quest.



Setup of the VRaha application “immersive Virtual Memory Task”.

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

A major benefit of our system, as compared to traditional psychometric assessments, is its close link to everyday settings (e.g., household environment). It better reflects the real world’s demands on the cognitive capacities of spatial attention and depth perception than comparable screen-based (2D) or paper-and-pencil procedures. Our user interaction is based on gesture recognition—rendering the use of handheld controllers unnecessary—to enable a more naturalistic interaction. The continuously measured behavioral parameters (such as processing speed, pauses, movement directions) allow conclusions about underlying cognitive processes. These measurements are observer-

independent and therefore less prone to errors.

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

As we use commercially available hardware, we encountered some issues due to changes in the companies’ market strategies (e.g., discontinuation of the Microsoft Kinect). While rapid developments, especially in the hardware sector, allow for continuously more efficient and affordable setups, it can be challenging to quickly adapt to these changes. Unexpectedly, there were hardly any difficulties concerning cybersickness. Patients tolerated the testing well and were highly motivated to take part in the study.

# RESEARCH PROFILE

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

The main aim of the VRReha project is to develop, evaluate, and use virtual worlds for cognitive assessment and rehabilitation. We are currently conducting several feasibility studies in neurological patients with a wide spectrum of pathologies (vascular, traumatic, inflammatory). We are also running a larger systematic clinical study in patients with Mild Cognitive Impairment due to neurobiologically probable Alzheimer's Disease. We also developed and currently evaluate a rehabilitation program, which is

integrated with the assessment, so that, for example, difficulty levels and training strategies are adapted to the patients' performance in the diagnostic task. We are happy to have received the best demo prize at the ICVR 2019 in Tel Aviv (see photo).

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

There are more straightforward challenges like decreasing the XR hardware costs and increasing the availability of devices, preventing or solving cybersickness, ensuring connectivity in remote regions

(e.g., with 5G) as well as data security. Other challenges are bringing together (or establishing communication between) developers, scientists, and clinicians as well as properly validating XR applications (i.e., sorting what works and what doesn't) to fully leverage XR's potential. For example, systematic clinical trials with larger samples are needed for the standardization of paradigms and to increase the quality of scientific evidence.



VRRehawinning the best demo award at the ICVR 2019 in Tel Aviv (left to right): Harry Hallock (Berlin School of Mind and Brain, Charité), Naomi Gefen (Deputy Director General of Clinical Services in ALYN Hospital), Mykyta Kovalenko (Fraunhofer HHI), Stephan Krohn (Berlin School of Mind and Brain, Charité), Johanne Tromp (Max Planck Institute for Human Cognitive and Brain Sciences) and Sophia Rekers (Berlin School of Mind and Brain, Charité).

# CLINICAL PROFILE

## Division of Digital Psychiatry

### John Torous, M.D.

Director of the Digital Psychiatry Division, Beth Israel Deaconess Medical Center

Boston, Massachusetts, USA

<https://www.digitalpsych.org/>

### Where is your clinic / research institution located?

The Division of Digital Psychiatry is located in the department of Psychiatry at Beth Israel Deaconess Medical Center at Harvard Medical School in Boston, Massachusetts, United States of America.

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

We serve patients with serious mental illness like schizophrenia, bipolar, and major depressive disorder. We conduct numerous research studies and also offer a clinic where innovative technologies are used to augment care.

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

Our group uses a mhealth platform, mindLAMP [1], that we have developed and are sharing freely and openly: <https://www.digitalpsych.org/lamp/about>. mindLAMP offers the ability to capture multimodal data via ecological momentary assessments, digital phenotyping, cognitive assessments, and wearable sensor integration. The platform is also able to support brief app-based interventions that can be customized based on the research or clinical need. For use in care settings, we offer a care portal where patients can interact with



Part of the BIDMC Digital Psychiatry Team

their team, family members, and supporters in order to use their data towards recovery and wellness.

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

Flexibility to customize the platform to the needs of patients, ability to rapidly update the platform based on user feedback, and the opportunity to transparently share the entire platform are the key benefits we derive from mindLAMP. Technology for health is constantly updating, and being able to ensure our platforms grows with the field is critical. Patient privacy and data security is most important to us and being able to deploy our platform at local sites in a safe and secure manner has enabled us to reach sites in Africa, Europe, China, India,

Canada, and many in the United States.

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

Working at the interface of health, software development, and privacy is never simple. We are constantly working with partners using the platform to ensure it continues to run well and meet both local and global needs. With updates to Apple and Android software, we must be prepared to rapidly test and make changes so that everything continues to run smoothly. In creating a consortium of sites and partners using the platform around the world, we have also worked to balance diverse needs and use cases.

[1] <https://link.springer.com/article/10.1007/s41347-019-00095-w>

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

We are currently investigating how we can use the system to offer early warning signs of relapse in different conditions such as schizophrenia as well as opioid use disorder. Given the multimodal data we can collect, we use machine learning techniques to

find patterns that may offer a signal that someone is at higher risk and will benefit from early intervention.

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

Using mhealth tools like mindLAMP, it is increasingly possible to capture

large amounts of interesting data about health. The challenge now is transforming that data into clinically actionable insights that will benefit care. Understanding and testing new innovations in real world care settings is important for ensuring results are generalizable and actually applicable outside of the clinical research environment.



## 13th International Conference on Disability, Virtual Reality & Associated Technologies

Serpa, Portugal ~ September 9-11, 2020

### Conference Theme

Special Theme for 2020: Rehab Gamification. As a special theme for ICDVRAT 2020, we encourage papers describing game-based solutions devised to rehabilitate motor and cognitive impairments. Papers accepted for the conference require the registration of at least one of the authors as a Full Delegate or Full Student Delegate to the conference.

This year, ICDVRAT is run with Interactive Technologies and Games (ITAG) Conference.

### Conference topics

Virtual and Augmented Reality environments | Physical rehabilitation | Cognitive rehabilitation | Clinical assessment | Input devices | Remote/Telecare | Game Based Learning | VR for Health | Sensory impairment | Mobile health applications | Robotics and education | Rehabilitation robotics | Communications aids | Communication and language | Input devices | BCI | Machine learning | Affective computing | Synthetic Agents

**More information**

<http://icdvrat2020.ulusofona.pt/>



The website at <http://www.isvr.org> acts as a portal for information about the society. We are keen to enhance the community aspects of the site as well as 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](mailto: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 1197 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](mailto:newsletter@isvr.org).



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