





# Digital Technologies for Rehabilitation Gemini Centre

### Launch Event

We are delighted to announce the launch of the newly established Gemini Centre on Digital Technologies for Rehabilitation, a collaboration between SINTEF, NTNU, St Olavs, and University of Oslo. As part of the Centre launch, we have an exciting programme of talks and presentations from clinicians, researchers, patient organisations, and digital technology developers/providers. *The event will be held in-person in Trondheim and online*.

**Friday** 6<sup>th</sup> September 2024, from 08.30 to 12.00.

### Join us...

...In-person: Room: <u>03-059</u>, <u>Helgasetr</u>, <u>NTNU - Øya - MazeMap</u>, Vanglunds gate 2, Trondheim. **PLEASE NOTE: The room can accommodate up to 100 people, so please let us know if you plan on attending in person.** Please contact <u>mari.gunnes@sintef.no</u> or <u>roshan.nair@sintef.no</u> by 30<sup>th</sup> August.

### ...Online: Join Zoom Meeting:

https://NTNU.zoom.us/j/99401995975?pwd=N3ny4LGPbYNYvINrEuSxP3OWozWGee.1 Meeting ID: 994 0199 5975. Passcode: 183004

#### **Keynote presentations:**

- "How does neuroscience inform the development and use of neurorehabilitation technologies? And how can they become standard clinical practice?" *Prof Jane Burridge, PhD (University of Southampton, UK)*
- "Digital technologies in aphasia rehabilitation" Prof Frank Becker, MD, PhD (Sunnaas Rehabilitation Hospital & University of Oslo, Norway)
- "Digital Technologies in Neurorehabilitation: Supporting Upper Limb Recovery along the Continuum of Care" Prof Olivier Lambercy, PhD (Rehabilitation Engineering Laboratory, ETH Zurich, Switzerland)

#### Technology demonstrations:

- PPM Robotics, Prof Trygve Thomessen, PhD
- Myworkout, Knut Løkke

Learn more about the Gemini Centre at: English website Norsk nettside



#### Keynote speakers:

#### Prof Jane Burridge - University of Southampton, UK

## How does neuroscience inform the development and use of neurorehabilitation technologies? And how can they become standard clinical practice?

**Abstract:** In the 1990s Engineers at Massachusetts Institute of Technology (MIT) developed the first end-effector Robot, the MIT Manus. In 2001 the 'Lokomat' walking robot was launched in Zurich and the company, Hocoma, was formed. Functional Electrical Stimulation (FES), to support drop-foot was first shown to be clinically effective in 2000. A quarter of a century later evidence of effectiveness for rehabilitation technologies is still insufficient for most healthcare to fund it as standard clinical practice.

My talk will begin by considering how neuroplasticity and sensory motor learning relate to recovery and underpin the design and use of technologies. I will examine the evidence that 'dose' matters and consider whether technologies increase dose and whether motivation and ease of use are also factors.

I will discuss how can we get stronger evidence, whether the RCT the best model and whether we have the best outcome measures. Are we ready to conduct largescale clinical trials, or are there other questions that need to be answered first? Is it a cultural or education problem?

Finally, I will apply the points raised to a few examples of technologies for upper limb rehabilitation



Biography: Jane Burridge is Emerita Professor of Restorative Neuroscience at the University of Southampton. Jane teaches Neurological Rehabilitation and Neuroscience at Undergraduate and Postgraduate levels. She was president of the UK Association of Chartered Physiotherapists in Neurology (ACPIN) for eight years, retiring in March 2024. Her research is about using technologies to improve recovery of movement following acquired brain damage. Jane is interested in understanding the mechanisms associated with loss and recovery of motor function. Recently she has led work into the development of guidelines on the use of Functional Electrical Stimulation and on functional assessment, especially how restoration of function can be distinguished from compensation. Her work crosses traditional rehabilitation boundaries; collaborating with engineers, neuroscientists and psychologists.



#### Prof Frank Becker - Sunnaas Rehabilitation Hospital & University of Oslo, Norway

#### Digital technologies in aphasia rehabilitation

**Abstract:** Language disorder due to acquired brain injury – aphasia – is a serious, disabling condition. Speech and language treatment is effective, but not always available and interventions can be improved. Digital technologies can contribute to better services in a number of ways. The talk will present examples of the use of digital technologies in aphasia rehabilitation, based amongst others on telerehabilitation research performed at Sunnaas Rehabilitation Hospital and upcoming ESO guidelines for digitally supported aphasia services.



**Biography:** Frank Becker MD PhD is a specialist in physical and rehabilitation medicine with over 20 years of clinical and research experience, especially regarding rehabilitation of stroke, traumatic brain injury and other acquired brain injuries. He holds the positions of clinical medical director at Sunnaas Rehabilitation Hospital and professor at the University of Oslo. Becker leads work with revision of the Norwegian national guidelines for rehabilitation of stroke, and is head of the advisory council for rehabilitation (Fagråd rehabilitering) of the South Eastern Norway Regional Health Trust. At Sunnaas Rehabilitation CenHospital, he heads the research group for aphasia and register data.



#### Prof Olivier Lambercy - Rehabilitation Engineering Laboratory, ETH Zurich, Switzerland

# Digital Technologies in Neurorehabilitation: Supporting Upper Limb Recovery along the Continuum of Care

**Abstract:** Rehabilitation after neurological injuries faces many open challenges due to the increasing number of patients, the limited number of healthcare professionals and the raising healthcare costs, which ultimately impacts the therapy dose patients receive. Digital technologies could enable a paradigm shift in neurorehabilitation models currently heavily relying on hospital stays/visits. In this talk, I will provide an overview of our work on the development and clinical evaluation of robot-assisted technologies to support assessment and rehabilitation of upper limb function along the continuum of care, from the hospital bedside to the home. I will discuss key enablers and challenges in view of the development and acceptance of such novel digital technologies in neurorehabilitation.

Biography: Olivier Lambercy obtained the PhD degree from the National University of Singapore



in 2009 and joined the Rehabilitation Engineering Laboratory at ETH Zurich the same year. Since 2023, he is Adjunct Professor in the Department of Health Sciences and Technology (D-HEST) and the co-director of the Rehabilitation Engineering Laboratory. His research focuses on the development and clinical application of novel technological solutions to improve upper limb assessment, therapy and assistance after neurological injuries. He is a board member of the International Consortium for Rehabilitation Robotics, a member and principal investigator at the Singapore-ETH Center as part of the Future Health Technologies program, a Scientific Advisor to the ETH spin-off AUXIVO, and serves as Associate Editor for the Journal of Neuroengineering and Rehabilitation since 2017.

