



September 14-15, 2023 - Tokyo

# 6th JP-EU Workshop on Neurorobotics Healthcare and ageing in the era of AI

Scientific, policy and regulatory challenges of AI and robotics in healthcare  
for the ageing society in Europe and Japan.

Nakashima Hall, University of Tokyo  
Yayoi Campus, Food Science Bldg.  
1 Chome-1-1 Yayoi, Bunkyo City, Tokyo 113-0032

# Day 1

## A healthier world: AI technologies and the future of healthcare.

### 09h00 – 09h15

Opening Address and Welcome by Dr MASA AKI MOCHIMARU and Prof. ALOIS KNOLL

### 09h15 – 10h15

Dr MASA AKI MOCHIMARU, (The National Institute of Advanced Industrial Science and Technology)  
Prof. ANDREAS ROWALD, (Friedrich Alexander University Erlangen-Nürnberg)

### 10h15 – 10h30

Coffee Break

### 10H30 – 11H30

Dr SATOSHI OOTA, (RIKEN National Institute of Physical and Chemical Research)  
Dr KUNIYA ABE, (RIKEN BioResource Research Center)

### 11H30 – 12H30

Dr FABRICE MORIN, (Robotics, Artificial Intelligence and Real-time Systems, Technische Universität München)  
Dr MIHOKO OTAKE, (RIKEN Center for Advanced Intelligence Project)

### 12H30 – 14H00

Lunch break

### 14H00 – 15H00

Dr TOSHIYASU ICHIOKA, (RIKEN Europe Office)  
DOMINIC CARTER and SUSANNE WALLOSCHHECK (The Carter Group)

### 15H00 – 15H20

Coffee Break

### 15H20 – 16H20

Dr GUILLAUME BERNARD (LNE, Laboratoire national de métrologie et d'essais)  
Prof. PETRA RITTER (Charité University Hospital Berlin)

### 16h20 – 17h00

Reflections and open questions - Roundtable

# Day 2

## Intelligent ageing – how do we achieve that?

**09h00 – 09h15**

Welcome and introduction to the day's talks

**09H15 – 10H15**

Dr RIICHIRO HIRA, (Tokyo Medical and Dental University)

Dr CARLOS ENRIQUE GUTIERREZ , (SoftBank Corp, AI Strategy Office)

**10H15 – 10H30**

Coffee Break

**10H30 – 11H30**

KENNY SONG, (CITADEL AI)

DR SAIKI HASE/ DR. MYRA BAUERSACHS, (DFG - Japan Society for the Promotion of Science)

**11H30 – 12H30**

Discussion and roundtable about a possible joint future research and validation framework

**12H30 – 14H00**

Lunch break

**14H00 – 15H00**

PROF MICHIIHIKO MINOH (RIKEN Information R&D and Strategy Headquarters)

DR JAMES WRIGHT (Queen Mary University of London)

**15H00 – 15H20**

Coffee Break

**15H20 – 16H20**

Dr GENTIANE VENTURE (University of Tokyo)

Dr HIROYUKI FUJII (Kawada Robotics)

### COMMUNITY BUILDING DINNER – by invitation only

The dinner will take place at **Tsukiji Uemura Yushima** restaurant, on the **14th of September**, at **19h:00**.

# Titles and Abstracts

**Speaker:** ANDREAS ROWALD

**Title:** A computational approach to precision spinal cord stimulation

**Abstract:** *Efficient identification of effective, safe, and personalized spinal cord stimulation parameters is critical due to the growing clinical applications, complex technologies, and pathophysiological variations among individuals. In turn, this approach offers cost-, time-, and risk-limited therapeutic options for neurological disorders. Here, we present a computational method using multi-scale digital twin models for therapy optimization and clinical decision support of spinal cord stimulation in the use-case of lower limb motor recovery after spinal cord injury. Our computational method informed the design of a specialized electrode lead and guided its neurosurgical placement, leading to three individuals with complete sensorimotor paralysis being able to stand, walk, cycle, swim, and control trunk movements with spinal cord stimulation paradigms identified within a single day, as opposed to several weeks in previous attempts.*

**Speaker:** FABRICE O. MORIN

**Title:** Brain simulation as a bridge to the real world: the Neurorobotics Platform

**Abstract:** *A mechanistic understanding of the brain is therefore a prerequisite to any intervention (e.g., on cognitive decline, motor impairment after a stroke, etc.) involving novel invasive technologies such as neuroprosthetics or electroceuticals. Brain simulation is one way to develop such understanding and experimentally put it to the test. In this talk, I will introduce the NRP as a framework capable of seamlessly integrating multiple functional components such as deep neural networks, spiking neural networks, custom-made algorithms or classical control systems, with the view to either study or train the functionality that emerges from their interactions. I will focus on the modular architecture of the NRP and the extensive use it makes of container technology that allow each of different heterogeneous components to both run and communicate at different frequencies in the simulation time domain, in a manner that is reminiscent of what happens in the brain where different anatomical areas exhibit neuronal activity in different frequency bands. I will suggest that the NRP thus provides a unique framework to support the future implementation of complex cognitive architectures comprised of heterogeneous components, as well as the in silico study of emergent phenomena in such systems.*

**Speaker:** GUILLAUME BERNARD

**Title:** Certification and regulation for AI systems

**Abstract:** *Presentation of current work on certification and regulation for AI systems, with a focus on the European AI Act and the AI process LNE certification. This overview will not focus on a particular application of AI, since the AI Act and LNE certification have a broad application, for instance health or agrifood.*

**Speaker:** CARLOS ENRIQUE GUTIERREZ

**Title:** Advancing Toward a Platform for the Deployment of Multispecies Digital Brains: Mice, Marmosets, and Humans

**Abstract:** *The development of web-based tools for systematic brain modeling can play a pivotal role in collaboration-driven modeling. By consistently incorporating new data and leveraging the collective expertise of modelers, computational models can undergo continuous enhancement. This collaborative approach is essential for ensuring the validation and transparency of models, particularly as they evolve into predictive tools and services for the systematic exploration of dynamics underlying mental disorders. To this end, we introduce a prototype web application designed to facilitate the permanent improvement and evolution of spiking neural network models. As a preliminary effort, we created a basal ganglia model and verified the reproducibility of computational modeling research and the traceability of modeling procedures. Through simulations, we explored transient dopamine fluctuations during learning and observed disruptions in previously examined learning processes within a Parkinsonian model simulation. This comprehensive framework is versatile, allowing the modeling of diverse brain regions. Its application extends to the integration of anatomical and physiological datasets from the brain/MINDS project, with the goal of enabling translation across animal and human models. Moreover, our approach seeks to foster synergy with tools and infrastructure from the EU's EBRAINS and the Allen Institute.*

**Speaker:** PETRA RITTER

**Title:** EU Reference Center: Testing and Experimentation Facility for Health AI and Robotics.

**Abstract:** *Testing and Experimentation Facility for Health AI and Robotics (TEF-Health) is a European reference center led by Charité with 51 participating public and private entities from nine countries. TEF-Health (1) carries out tests and experiments of AI solutions in real or realistic environments; (2) Implements evaluation activities to facilitate market access for trustworthy intelligent technologies considering regulatory requirements (certification, standardization, code of conduct), and ensures easy access to these resources; and (3) Optimizes investments by capitalizing on past investments. TEF-Health provides existing expertise and infrastructure for design and implementation of AI testing in real world environments. The main asset lies in the general structure of each node, designed to address the broad environment of evaluation and testing, to speed up the development and the market access of AI solutions in healthcare. TEF-Health generates impact by increasing effectiveness, resilience, sustainability of health systems, reduce inequalities; and ensure compliance with legal, ethical, quality and interoperability standards. The project forms a network of leading EU hospitals and Medical Universities e.g., Charité and Karolinska Institute, National Metrology Institutes for definition of standards, and certification bodies as well as innovation clusters, e.g., European Institute of Technology EITHealth with links to the European Health Data Space. TEF-Health addresses ethical, and societal aspects with supported by patient organizations.*

**Speaker:** KENNY SONG

**Title:** How Citadel AI Validates High-Risk AI Systems

**Abstract:** *Citadel AI is a Tokyo-based company that builds software to measure the quality of AI systems. We work with both AI developers and AI auditors (e.g. the British Standards Institution), and were founded by engineers From Google Brain, Waymo, Toyota, PayPal with first-hand experience deploying high-risk AI systems. In this talk, Kenny will discuss the landscape of high-risk AI, why it's so hard to validate the quality of AI systems, and Citadel AI's technology.*

**Speaker:** JAMES WRIGHT

**Title:** Learning from the case of care robots in Japan

**Abstract:** *Like many other post-industrial economies, Japan is in the grip of a deepening crisis as growing elder care needs outstrip the availability of caregivers. Robots have been repeatedly presented by elements of the Japanese government and industry as a high-tech solution to this problem, and large sums of money have been invested in their development and implementation over the past decade. However, these efforts have so far met with only limited success, with uptake and implementation far below initial expectations at the start of the 2010s.*

*This talk draws on ethnographic fieldwork undertaken in Japan since 2016 at a national research institute working on the world's largest care robot project, and at an elder care home introducing three different care robots. It examines some of the reasons why these devices have not been widely adopted in day-to-day institutional care settings and seeks to draw some lessons for the broader development and deployment of robots and AI in care.*