The 48th Annual Meeting of the Japan Neuroscience Society Meeting Report

Name : YAN PAN

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The 48th Annual Meeting of the Japan Neuroscience Society was held from July 24th to 27th, 2025, at the Toki Messe Convention Center in Niigata, Japan. The Japan Neuroscience Society is one of Japan's largest and most influential academic organizations dedicated to neuroscience research. It is committed to advancing fundamental and clinical research in brain science and neuroscience, fostering academic exchange and international collaboration within the field, and nurturing the development of young scientists. This prestigious academic gathering brought together neuroscience researchers, clinical experts, and industry representatives from around the globe to discuss the most cutting-edge discoveries and technologies in neuroscience. Through academic presentations, symposia, invited lectures, poster sessions, and technical exhibitions, the conference provided attendees with abundant opportunities for learning and networking. Both early-career researchers and established scholars found ample space for inspiration and professional growth within this academic feast.

Here, I would like to extend my most sincere gratitude to the Japan Neuroscience Society and the Tianqiao and Chrissy Chen Institute. Thank you for awarding me the Travel Award and for your sponsorship, which enabled me to personally attend this top-tier international academic conference. Through the conference, I had the chance to attend insightful presentations by leading scientists in the field, exchange the latest research progress with peers from around the world, and encounter many innovative technologies and methodologies, such as high-precision imaging tools, neuromodulation devices, and data analysis platforms. These experiences have not only broadened my

academic horizons but also infused fresh inspiration into my own research. Furthermore, the social events and party organized by the conference allowed me to connect with many like-minded potential collaborators. This holds profound significance for my scientific career.

International Exchange Meeting for Young Researchers

The meeting invites many young researchers, where young researchers can freely present their research results, providing an opportunity for young researchers from all over the world to communicate.

Group photo of the young researchers exchange meeting

Plenary Lecture by Chris I. De Zeeuw

A lecture was delivered by renowned neuroscientist Chris I. De Zeeuw. He is Chairman of the Department of Neuroscience at Erasmus MC in Rotterdam, Vice-Director at the Netherlands Institute for Neuroscience in Amsterdam, and Director of Neurasmus BV. His group focuses on the role of the cerebellum in sensorimotor integration and cognition. His topic for this conference was "Olivocerebellar Orchestration of Behaviour." He began by outlining the organization of the cerebellar system. Then he explained upbound and downbound microzone activity, proposing a relationship between the predominant unidirectional changes in spiking activity during learning in these upbound and downbound cerebellar microzones and the primary types of

plasticity induction. Next, he introduced the vestibular ocular reflex (VOR) as a learning paradigm in the upbound and pavlovian eyeblink conditioning as a model in the descending module. He proposed that simple spike (SS) firing rates increase during ascending learning, while they decrease during descending learning. He suggested that long-term potentiation (LTP)-like plasticity may dominate ascending learning, whereas cellular suppression mechanisms mediate descending learning. Then he moved on to cognitive learning within dynamic modules, proposing that cerebellar learning might be driven by the failure or success of motor or non-motor responses. This led to emphasizing the critical importance of the principal olive in humans. He presented a series of studies demonstrating that the olivocerebellar system is involved in learning a complex form of decision-making based on sensory discrimination. Furthermore, during discrimination learning, the timing shifts of complex spikes (CS) depend on MDJ input. Climbing fibers also alter simple spike (SS) responses over time during cognitive learning, and complex spikes drive changes in simple spike modulation. Finally, he discussed learning dependent timing in the inferior olive, investigating how inputs from the MDJ and the cerebellar nuclei interact.

Symposium 1S06a

The theme of this symposium is "Innovative ultrasound technologies for understanding brain function". It mainly consisted of separate oral presentations by distinguished scientists from several different universities. The entire symposium's theme centered around ultrasound neuromodulation technology. From Fukuoka University, Hiroshi Kida explained that low-frequency ultrasound can achieve effective central nervous system drug/gene delivery, but currently the reactivity of low-frequency ultrasound and the mechanism of intracellular delivery are not yet clear and still await research. From National Institutes for Quantum Science and Technology, Yumi Matsushita's presentation theme was Ultrasound neuromodulation via acoustic

radiation force mediated by TRPC6, and proposed the hypothesis that acoustic radiation pressure produces mechanical force to activate some molecules in neurons and ultrasound neuromodulation. From Kindai University and Hokkaido University , Kaede Yoshida's presentation theme was Non-invasive cell type-specific neuromodulation using a sonogenetic technology, introducing in vivo sonogenetic technology and the translational potential of sonogenetic for epilepsy treatment, etc. This suggests the developmental potential of ultrasound neuromodulation technology for future drug delivery and disease treatment.