

#	Time	Title	Presenter
1	8:50~9:00	Opening	Nobuyuki Sakai
2	9:00~9:15	Microplastics in Coastal Environments: Observational Insights and Potential Applications of AI-based Analysis	Batdulam Battulga
3	9:15~9:30	Why are Organic Vegetables Supported but Not Purchased? An Analysis based on Consumer–Citizen Duality	Yasumichi Oka (Online)
4	9:30~9:45	Investigating the Rejection Sensitivity Hypothesis in Perfectionism: An fMRI Study	Erina Miyatsu
5	9:45~10:00	Identifying the Multidimensional Structure of Sauna Bathing Values	Shoki Ogata
6	10:00~10:15	Qualia Awareness and Function: A Conceptual Framework and Research Directions	Ryo Saito (Online)
7	10:15~10:30	Dynamic Reward System Activation during Extrinsic Interpersonal Emotion Regulation	Shao Chong
8	10:30~10:45	Break	
9	10:45~11:00	Infant Sleep and Social-cognitive Development	Chia-huei Tseng, Sachiko Kiyama, Hinako Kojima, & Esther Lau
10	10:45~11:00	Anger Boils in the Gut but not the Heart: An fMRI Study of How Language conveys Bodily Location of Visceral Feelings of Emotion	Hyoungsun Kim, Motoaki Sugiura, Hyeonjeong Jeong
11	10:45~11:00	Correlation between Reaction Times in Indirect Speech Act Recognition and Neuropsychological Indices among Individuals with Autism Spectrum Disorder	Sachiko Kiyama
12	11:30~11:45	The Double Neural Costs of AI Corrective Feedback: An fMRI Study on L2 Conversation	Chunlin Liu, Shoma Tanaka, Satsuki Kurokawa, Taira Nakajima, Takumi Uchihara, Hyeonjeong Jeong, Motoaki Sugiura
13	11:45~12:00	Neural Correlates of Cognitive Load and Responsibility in AI-Assisted Emotional Decision-Making	Satsuki Torige
14	12:00~12:15	Enhancing Brain Function through Cerebrovascular Exercise Training: Methodological Development	Ko Matsui
15	12:15~13:15	Lunch Break	

#	Time	Title	Presenter
16	13:15~14:15	Invited Talk 1: BCCWJ-MRI/MEG: Modeling Sentence Processing in the Brain with Language Models	Yushi Sugimoto (The University of Osaka)
17	14:15~14:30	Language-independent Speech-to-singing-voice Conversion for Language Revitalization	Akinori Ito
18	14:30~14:45	Synthetic Voices in Education: Exploring the Impact of GenAI-based Text-to-Speech Lectures on Student Engagement and Comprehension	Masako Hayashi (Online)
19	14:45~15:00	Script-Driven Parcellation of the VWFA: ICA and ROI Evidence for English, Kanji, and Kana	Mariko Nakayama
20	15:00~15:15	An Attempt at Recognizing Kuzushiji using Text Information	Shinichiro Omachi
21	15:15~16:15	Invited Talk 2: Agentic AI for Radiology Education	Akash Awasthi (NASA Earth eXchange)
22	16:15~16:30	Break	
23	16:30~17:30	Invited Talk 3: Quantum meets AI: From Foundations to Frontiers	Marcello Bonsangue (Leiden University)
24	17:30~17:45	Enhancing Tsunami Evacuation Modeling using Human Mobility Analytics: Integrating Geographic, Psychological, and Data Science Perspectives	Ryo Saito (Online)
25	17:45~18:00	Analysis of Brain Activity during VR Tsunami Evacuation Training using fMRI and GIS	Daisuke Shiozaki
26	18:00~18:10	Closing	Shuichi Sakamoto
27	18:30~	Reception	

Online (Zoom) Meeting Information

URL: <https://zoom.us/j/95848623091?pwd=Zm2vsfA0lXU5ot5NLS88lggkE62bfX.1>

Meeting ID: 958 4862 3091

Passcode: 032497

Reception (from 18:30)

Lounge on the 4th floor of the RIEC Main Building

*Hosted by Advanced Institute of So-Go-Chi Informatics, Tohoku University
(March 23, 2026)*

Invited Presentation

Yushi Sugimoto

Recent advances in generative AI have spurred the use of deep neural network-based models for encoding and decoding analyses in neuroscience. A growing trend in this line of research is the use of more naturalistic language stimuli along with efforts to make the brain datasets publicly available. However, publicly available datasets using Japanese stimuli are still limited. To address this, this presentation reports the collection of fMRI/MEG data using Japanese stimuli and presents the results of evaluating language models using the dataset.

Agentic AI for Radiology Education

Akash Awasthi

Radiology education requires trainees to develop both perceptual and interpretive expertise, yet this process is often constrained by limited access to expert guidance and a lack of personalized feedback. Many diagnostic errors arise from subtle perceptual oversights—such as missed fixations, short dwell times, or overlooked abnormalities—that current AI systems struggle to capture or explain. In his presentation, Dr. Awasthi will share his recent work on intelligent agent-based frameworks that integrate gaze behavior, diagnostic reasoning, and adaptive feedback to advance radiology training.

Quantum meets AI: From Foundations to Frontiers

Marcello Bonsangue

Quantum computing promises fundamentally new computational capabilities by exploiting quantum mechanical phenomena such as superposition and entanglement. At the same time, artificial intelligence has become a central driver for solving complex real-world and scientific problems. This talk provides a high-level introduction to quantum computing and its emerging intersections with AI. We begin with an intuitive overview of the mathematical and physical foundations of quantum computation, tailored for a non-specialist audience. We then explore how quantum computing can support AI and how AI can, in turn, accelerate quantum hardware design and control. Finally, we highlight how the synergy between quantum computing and AI could advance scientific discovery in materials science, chemistry, biology, and physics. The talk concludes with a personal view on realistic expectations, current limitations, and open research directions.

AI So-Go-Chi Research

Microplastics in Coastal Environments: Observational Insights and Potential Applications of AI-based Analysis

Batdulam Battulga

Microplastics (MPs) are pervasive contaminants in aquatic environments, posing potential risks to ecosystems and human health. Understanding their distribution, transport pathways, and interactions remains challenging due to complex environmental processes, particularly in dynamic coastal ecosystems. Their small size and widespread presence also limit detection using traditional monitoring approaches, highlighting the need for advanced computational tools such as artificial intelligence (AI). This study investigates the properties and distribution of MPs in coastal ecosystems of Japan using field samples collected from surface waters, bottom sediments, and beach sands. Extracted MPs were characterized by abundance, size range, and morphological type to examine spatial variability across environmental compartments. The results provide insights into the distribution of MPs in a coastal ecosystem. Based on these observations and existing datasets, this study reviews current detection methods and discusses the potential of AI-based approaches, particularly machine learning, to improve data interpretation and predictive analysis in MP research.

Why are Organic Vegetables Supported but Not Purchased?
An Analysis based on Consumer–Citizen Duality

Yasumichi Oka

The same individual may support policies that promote organic agriculture while refraining from purchasing organic vegetables. This apparent inconsistency can be explained by the concept of consumer–citizen duality, which refers to a situation in which preferences expressed as a citizen in the public sphere differ from choices made as a consumer in the marketplace. Using organic vegetables as an empirical case, this study aims to examine the extent to which such duality exists. An online survey was conducted with 1,584 Japanese adults. Approximately half of the respondents expressed support for the policy, whereas about 30% reported purchasing organic vegetables. Based on their policy stance and the share of organic vegetables in their purchases, respondents were classified into four groups. The results indicate that approximately 40% exhibit consumer–citizen duality, particularly those who support the policy but do not purchase organic vegetables (31.7%).

Investigating the Rejection Sensitivity Hypothesis in Perfectionism: An fMRI Study

Erina Miyatsu

To examine rejection sensitivity in perfectionism, this study used fMRI to test the hypothesis that failure under social evaluation elicits perceptions of social rejection. Failure under social evaluation was experimentally induced by combining observation via Zoom with incorrect feedback during task performance. Neural activity in brain regions associated with social rejection was analyzed, and the relationship between neural activity and perfectionism scores was examined using a general linear model.

Identifying the Multidimensional Structure of Sauna Bathing Values

Shoki Ogata

Although sauna bathing has long been enjoyed by people of all ages worldwide, the reasons underlying engagement in this practice remain insufficiently understood. Previous studies have examined the motivations and experiences of sauna users through survey research; however, these investigations have been largely descriptive and have not established, from a psychometric perspective, the subjective value structure underlying enthusiasts' preferences and repeated engagement.

To address this issue, we developed questionnaire items based on open-ended responses collected from sauna enthusiasts across Japan and conducted a quantitative survey, which was completed by the end of the previous academic year. The findings revealed a five-dimensional value structure. Based on the results of the final survey conducted during the current academic year, this presentation discusses the structural characteristics of sauna bathing values and their implications.

Qualia Awareness and Function: A Conceptual Framework and Research Directions

Ryo Saito

Qualia awareness refers to the awareness that oneself and others possess subjective experiences, as well as the recognition that such experiences may differ across individuals. This study proposes a conceptual framework of qualia awareness and examines its functional roles in communication and behavior. When individuals become aware of differences in perception, emotion, and interpretation, they may attempt to regulate their own behavior, for example by pausing to reflect and engaging in dialogue with others. Such awareness and attitudes can serve as a basis for communication and its regulation, and may also be related to happiness and well-being. This study examines a preliminary approach to questionnaire-based measurement, as well as computational methods for behavioral observation and analysis using natural language data on the internet, such as discussions about optical illusions on social media platforms such as YouTube. The proposed framework contributes to bridging cognitive science, communication research, disaster research, and educational practice, and provides directions for empirical investigation of how awareness of subjective experience relates to communication, well-being, and collaborative action.

Dynamic Reward System Activation during Extrinsic Interpersonal Emotion Regulation

Shao Chong

This study aims to elucidate the dynamic neural mechanisms of the reward system in interpersonal emotion regulation and to examine the influence of personality traits on the regulation process. An fMRI experiment will be conducted with 60 Japanese university students using an external interpersonal emotion regulation task via text messaging. By comparing regulation conditions employing cognitive reappraisal strategies with non-regulation conditions, we will identify differences in brain activity at each stage. Furthermore, through multiple regression analyses with personality trait data, we will systematically investigate the internal relationships among "personality traits — reward system — emotion regulation." Using an interdisciplinary approach that integrates affective psychology and cognitive neuroscience, this study seeks to clarify the neurobiological basis of the reward system in interpersonal emotion regulation and the role of individual differences.

Infant Sleep and Social-cognitive Development

Chia-huei Tseng, Sachiko Kiyama, Hinako Kojima, & Esther Lau

Infants undergo rapid growth and brain development, forming the basis for later social and cognitive abilities. We aim to establish a valid and rigorous protocol to study the association of infants' sleep and socio-cognitive development.

During the past year, we have made progress on (1): To develop an accurate and rigorous protocol in measuring infants' sleep with a combination of actigraphic measures and parental report. (2): Relocation and establishment of a new testing environment of infant behavioral tests, (3): To validate a battery of objective and short measures of preverbal infants' socio-cognitive development. We hope to continue the momentum and to expand the current paradigm to include environmental and parents' attitudes in the future.

Anger Boils in the Gut but not the Heart: An fMRI Study of How
Language conveys Bodily Location of Visceral Feelings of Emotion

Hyoungsun Kim, Motoaki Sugiura, Hyeonjeong Jeong

This functional neuroimaging study will investigate whether language expressions of bodily feelings of emotion are grounded in the neural representations of those bodily states. 80 healthy adult native speakers of Japanese (40 females) will complete two tasks inside the MRI. In the visceral language task, each trial consists of an emotional narrative followed by a target sentence expressing the emotion with reference to a bodily feeling and its location (e.g., 腸が怒りで煮えくり返った). In the interoceptive attention task, participants will be instructed to focus their attention entirely on the senses of the heart, stomach, or visual control. We will conduct a multi-voxel pattern-based analysis to examine whether the neural patterns evoked by language expressing visceral feelings in the chest versus the stomach aligns with the neural distinction between heart and stomach interoception in the same individuals. This study aims to contribute evidence that language conveys body-grounded aspects of human experience, beyond exteroception

Correlation between Reaction Times in Indirect Speech Act Recognition and Neuropsychological Indices among Individuals with Autism Spectrum Disorder

Sachiko Kiyama

Individuals with autism spectrum disorder (ASD), who experience difficulties in interpersonal interaction, tend to rely more on analytical verbatim memory than on intuitive gist memory. This study investigated how individuals with ASD utilize gist and verbatim representations when recognizing others' indirect intentions in conversation. A cognitive probe task indirect speech acts was administered to 29 adults with ASD and 27 typical developed (TD) adults. In this task, a situational description and a dialogue between two speakers were visually presented, and the final target utterance represented an indirect speech act. If the indirect speech act is strongly encoded as gist memory, it interferes with judgments based on verbatim memory, resulting in delayed responses. Such response delays can therefore be interpreted as an index of reliance on gist representation. The results showed that in both groups, negative judgments were significantly slower in the indirect speech condition than in the control condition. Furthermore, the magnitude of this delay effect was suggested to correlate with intelligence and subjective evaluations of interoceptive sensibility.

The Double Neural Costs of AI Corrective Feedback: An fMRI Study on L2 Conversation

**Chunlin Liu, Shoma Tanaka, Satsuki Kurokawa, Taira Nakajima, Takumi Uchihara,
Hyeonjeong Jeong, Motoaki Sugiura**

While Generative-AI tutors can offer real-time corrective feedback, their neural and affective impacts on second language (L2) learners remain unclear. This fMRI study investigates the neural mechanisms underlying explicit and implicit AI feedback during real-time L2 conversations. Although behavioral anxiety scores showed no significant differences across conditions, whole-brain analyses revealed a profound double dissociation driven by learner traits. During explicit correction, learners with high Fear of Negative Evaluation exhibited hyperactivation in the bilateral insula and hippocampus, indicating an “emotional cost” via social threat and immediate error-replay memory networks. Conversely, ambiguous implicit feedback forced learners with high Communication Anxiety Trait into auditory hyper-vigilance, imposing a “cognitive cost.” This was evidenced by hyperactivation in the right superior temporal gyrus and Rolandic operculum to decode acoustic cues. These findings propose a “Double Neural Costs” hypothesis, emphasizing the need for trait-adaptive AI tutors that balance emotional safety and cognitive clarity.

Neural Correlates of Cognitive Load and Responsibility in
AI-Assisted Emotional Decision-Making

Satsuki Torige

This study examined how suggestions generated by artificial intelligence influence cognitive load, sense of responsibility, and their neural correlates during emotional decision-making. Participants performed a sentencing decision task under fMRI while the presence or absence of AI-generated suggestions was experimentally manipulated. After reading each case, participants selected a sentence and rated their perceived cognitive load and sense of responsibility. Brain activity during the thinking and decision-making phases was analyzed using a general linear model, and subjective measures were also statistically compared between the AI and control conditions.

Enhancing Brain Function through Cerebrovascular Exercise Training:
Methodological Development

Ko Matsui

Previously, we demonstrated that rhythmic dilation and constriction of cerebral blood vessels (vasomotion) can be artificially amplified by presenting mice with ultra-low-frequency visual stimuli. Furthermore, continued “vasomotion training” (vaso-training) induces a form of plasticity in which vasomotion becomes globally synchronized across the brain (Sasaki et al., eLife, 2024). Building on these findings, our laboratory is currently testing the hypothesis that vasomotion facilitates the efficient delivery of metabolic energy molecules within the brain, thereby contributing to biologically characteristic forms of intuitive information processing and improved learning. We are currently developing a translational approach to apply the principles of vaso-training, originally established in mice, to human subjects, and to investigate the relationship between enhanced cerebral vasomotion and improvements in learning and memory performance. If vaso-training proves to be fully non-invasive and feasible in humans, it may open new avenues for applications in healthy aging and the treatment of dementia.

Language-independent Speech-to-singing-voice Conversion for Language Revitalization

Akinori Ito

With over 3,000 languages currently at risk of extinction, music is a powerful tool for language revitalization and cultural promotion. However, conventional singing voice synthesis often requires extensive, language-specific datasets and phoneme-level annotations, which are rarely available for endangered or minority languages. To address this, the authors propose a novel "Speech-to-Singing" framework that operates in a language-independent manner.

The system utilizes a pre-trained HuBERT model to classify input speech into voiced/unvoiced states, which are then synchronized with a musical score using Dynamic Time Warping (DTW). This approach eliminates the need for linguistic knowledge or parallel singing data. Finally, the WORLD vocoder re-synthesizes the voice by aligning speech features with musical timing and replacing the original pitch with the target melody. Experimental results showed a high classification accuracy of 95.7%. While the system successfully generates singing from speech without phoneme data, future work will focus on enhancing audio quality through neural vocoders.

Synthetic Voices in Education: Exploring the Impact of GenAI-based Text-to-Speech
Lectures on Student Engagement and Comprehension

Masako Hayashi

This study investigates the potential of synthetic voices in XR and Metaverse-based International Virtual Exchange (VE) to enhance multilingual educational environments. As generative AI advances, understanding the pedagogical impact of different voice types in flipped classroom settings is essential. We compared three narration styles—natural human, custom-trained synthetic, and traditional text-to-speech (TTS)—evaluating their effects on student comprehension, naturalness, and satisfaction. Thirty-two Japanese and international students participated in the evaluation. Results indicate that while natural voices remain the benchmark for human-likeness, high-quality custom-trained synthetic voices achieve comparable clarity and acceptability. Crucially, in foreign language localization, synthetic voices can surpass natural voices in understandability and learner preference. Higher education.

Mariko Nakayama

A previous fMRI study examining visual word processing of Chinese-English bilinguals (Zhan et al., 2023) reported that the visual word form area (VWFA), the region of the brain in the left fusiform gyrus specialized for processing word form, may recruit different patches of cells to process Chinese and English, adapting to orthographic characteristics of the word shapes. The present experiment aimed to replicate the results with Japanese-English bilinguals and to further examine parallel specificity in processing Kanji and Katakana, scripts with very divergent orthographic forms. ROI analyses identified distinct groups of cells with differential sensitivities to English, Kanji, and Kana. The Nonparametric Independent Component Analysis (NICA) further revealed functionally distinct neural response dimensions across scripts and word-likeness stages. Extending the findings of Zhan et al. (2023) to three script contrasts, our results indicate that VWFA contains voxel populations with graded, script-dependent response profiles. The NICA decomposition and language-preference mapping together suggest that the region accommodates multiple writing systems through partially distinct, spatially distributed neural representations rather than strictly modular, non-overlapping territories.

An Attempt at Recognizing Kuzushiji using Text Information

Shinichiro Omachi

This research proposes a method based on a Vision Language Model for recognizing cursive Japanese characters (kuzushiji), particularly for character types with limited training data or absent from the dataset. The CLIP model consists of Image and Text Encoders that maximize the similarity between paired image-text features while minimizing the similarity between other pairs. Since Chinese characters comprise various structural components, their recognition requires both spatial information (component positioning) and structural information (character composition). The study first proposes enhancing structural information in text by adding English words and recursively decomposing kanji. Additionally, recognizing that font images contain spatial information, the method combines text and font images during training. Experimental results demonstrate that the proposed text enhancement achieves higher accuracy than using font images alone, and the fusion of text with font images significantly improves recognition accuracy for zero-shot character types, confirming the possibility of integrating structural and spatial information for kanji recognition.

Enhancing Tsunami Evacuation Modeling using Human Mobility Analytics:
Integrating Geographic, Psychological, and Data Science Perspectives

Ryo Saito

Traditionally, evacuation behavior during disasters has been understood based on questionnaire surveys and interviews, which have left limitations in generalizability. In recent years, the widespread availability of mobile device–based human mobility data has made it possible to capture people’s movements during disasters at large and detailed spatio-temporal scales. However, there remains a challenge in understanding individuals’ perceptual and personal aspects, which may be related to behavioral choices during disasters. This study analyzes people’s movements in affected areas during the 2024 Noto Peninsula earthquake based on GPS data obtained from a smartphone application and conducts an online survey of the application’s users. This presentation will provide an overview of the results of the human mobility analysis of evacuation behavior and the questionnaire survey, and discuss the possibility of evacuation behavior modeling that integrates findings from geographic, psychological, and data scientific analyses.

Analysis of Brain Activity during VR Tsunami Evacuation Training using fMRI and GIS

Daisuke Shiozaki

This study examines brain activity underlying evacuation behavior during tsunami disasters. In addition to the anticipated Nankai Trough earthquake, a large tsunami may occur along the northeastern coast of Hokkaido due to earthquakes along the Japan or Chishima Trenches. Hokkaido's 2022 disaster estimates predict up to 149,000 fatalities, but rapid evacuation could reduce this to about 41,000, highlighting the importance of understanding evacuation behavior. To investigate this, a VR-based evacuation drill system was combined with functional magnetic resonance imaging (fMRI) to measure neural activity during simulated evacuation. 25 participants performed a VR evacuation task while brain activity was recorded and analyzed using SPM12. Participants were divided into successful and unsuccessful evacuation groups. Results showed that successful participants exhibited positive correlations between the amygdala and hippocampus, while unsuccessful participants showed negative correlations.