RIEC International Symposium

When AI Meets Human Science:

The 9th Tohoku – NTU Bilateral Symposium on Interdisciplinary AI and Human Studies

Date: November 6–7, 2026

Venue: RIEC, Tohoku University (Nov 6) | Akiu Onsen Sakan (Nov 7)



Friday, November 6

Time	Speaker	Topic
10:00		**Opening Remarks**
Session 1 (Chair: Satoshi Shioiri)		
10:15 - 11:15	**Chien-Chung Chen**	Visual Preference for Symmetry
	Shuichi Sakamoto	Directional Dependence of Auditory Spatial Processing
		Break
Session 2 (Chair: Nobuyuki Sakai)		
11:30 - 12:30	**Yong Song Huang**	From Vision to Experience: Exploring Art, Smell, and Emotion through Human–AI Collaboration
	I-Hui Hsieh	Absolute Pitch, Autistic Traits, and Audiovisual Speech Perception in Noisy Environments
	Doris Chow	Crossmodal Correspondences in the Lab and Beyond
	Watanee Jearanaiwongkul	Reliable Explainable AI through Knowledge Integration
		Lunch Break
Session 3 (Chair: Yumi Hamamoto)		
14:00 - 15:15	**Hyeonjeong Jeong**	Multimodal and Embodied Language Learning in the Age of AI
	Yuki Murai	How We See What Others Feel: Context, Body Movement, and the Individual Observer
	Toru Nagahama	From Clicks to Copresence: Making Invisible Learning Visible Again
	Teeradaj Racharak	Can We Trust What AI Tells Us? Making AI Explain Itself
	Satoshi Shioiri	Audiovisual Interaction of Spatial Attention
		Break
Session 4: Poster Session (Chair: Kowa Koida)		
15:30 - 16:30	**Chia-Ching Wu**	Mapping Deep-Network Layers onto Human Visual Cortex
	Cheng-Hsuan Chen	The Contribution of Facial Features to Attractiveness Judgments: Evidence for Analytic Processing
	Yu-Sin Kuo	Effects of Depth Cues on the Perception of Second-Order Symmetry
	Ruiling Guo	Gender Bias in Judging Full-Body Movements in Humans and AI
	Zahra Davoudi	Painting with Odors: Odor, Color, and Object Choice
	Hyoungsun Kim	Anger Boils in the Gut but Not the Heart: An fMRI Study of How Language Conveys Bodily Location of Visceral Feelings of Emotion
	Pierre Jouffroy	Lighting and Emotion in Virtual Reality: Key Lighting and Color Grading
	Lee Lin	Color Representations in Human Cortex Studied by fMRI Adaptation: Technique with Two Types of Color Perception Tasks
	Aiki Humeau	Benchmarking Skeleton-Based Deep Learning Models for Emotion Recognition on an Emotion-Labeled Human Motion Dataset
	Yuto Ogata	StereoBrake: Towards Mitigating VR Sickness by Suppressing Stereopsis with a 2D Projection
	Kanta Ozawa	Contextual Effects on AI-Based Affective Recognition from Human Whole-Body Movements
19:00 - 21:00		**General Discussion**

Saturday, November 7

Time	Speaker	Topic
Session 5 (Chair: Miao Cheng)		
09:00 - 10:00	**Brown Po-Jang Hsieh**	The Scientific Study of Human Consciousness
	Yasuhisa Hirata	Empowering People through Human-Centered AI Robotics: Encouraging Challenge and Social Participation
		Break
Session 6 (Chair: Shuichi Sakamoto)		
10:15 - 11:15	**Pi-Chun Huang**	Beyond Individual Senses: Crossmodal Interactions in Human Perception and Artificial Intelligence
	Sean Shao-Min Hung	Seeing Without Seeing: Implicit Peripheral Color Processing
	Pei-Yin Chen	Cortical Representation under Wide-View Visual Experience
	Lin Gu	EvoGenesis: From Scientific Discovery to Physical AI
		Break
Session 7 (Chair: Yujie Peng)		
11:30 - 13:00	**Asaf Bachrach**	Understandoing: wondering as a collective engagement in/with the world a movement exploration
		Workshop 1
		Lunch Break
Session 8 (Chair: Yujie Peng)		
14:00 - 16:00	**Chia-huei Tseng**	Copresence beyond Time and Space
	Chico Katsube, Shoko Kashima	**Workshop 2:** By a Practical and Physical Approach
17:00 - 21:00		**Small Group Discussion**

東北大学 RIEC Research Institute of Electrical Communication AI So-Go-Chi Tohoku University Advanced Institute of So-Go-Chi (Convergence Knowledge) Informatics AIROBO CO PRE SENCE 学術変革領域研究 A 「共在研究」

Moderator



Satoshi Shioiri

Advanced Institute of So-Go-Chi Informatics,
Tohoku University, Sendai, Japan

Biography

SATOSHI SHIOIRI received the B.S. degree in mechanical engineering from Tokyo Institute of Technology, in 1981 and the M.S. and PhD. degrees in Physical Information Engineering from Tokyo Institute of Technology, in 1983 and 1986. From 1986 to 1989, he was a postdoctoral fellow at University of Montreal, from 1989 to 1990 he was a postdoctoral fellow at Advanced Telecommunications Research Institute International, Kyoto. He was an assistant professor, an associate professor, and professor in Chiba University from 1990 to 2004. He has been a professor in Tohoku University since 2004. His research interests include motion perception, depth perception, color perception, visual attention, eye movement and vision for action.



Chien-Chung Chen

Department of Psychology,
National Taiwan University, Taiwan

Talk: Visual Preference for Symmetry

Abstract

Regularity in image statistics can influence the human aesthetic preference for a complex visual stimulus. In particular, symmetric patterns are more aesthetically appealing than asymmetric ones. In addition, pixel correlations, reflected in the slope of the image's spectral power distribution, also strongly affect aesthetic preference. We investigated how these two factors jointly affect aesthetic preference by manipulating both the power spectrum and the symmetry level, defined as the number of symmetry axes in an image, and assessing aesthetic preference on a 6-point Likert scale. Our results showed that the preference ratings increased with the symmetry level. However, the effect is not limited to mirror symmetry but also to repetition or anti-symmetry, suggesting that the number of unique elements in an image was key. Preference increased and then decreased with amplitude spectrum slope. Symmetry level and amplitude spectrum slope interacted strongly on preference rating, such that symmetry can amplify the amplitude spectrum slope's effects. A quadratic function of the spectrum slope can describe such effects. That is, preference is an inverted U-shaped function of spectrum slope whose intercept is determined by the number of symmetry axes. The modulation depth of the quadratic function manifests the interaction between the two factors. Our result is thus consistent with the fluency theory of aesthetic preference.

Biography

Professor Chen, Chien-Chung received his Ph. D. from University of California, Santa Barbara, working with Dr. John Foley on computational modeling of human spatial vision and color vision. Afterward, he completed his post-doctoral training with Dr. Christopher W. Tyler at the Smith-Kettlewell Eye Research Institute working on various topics in spatial vision, theories of psychophysics, and, later on, functional magnetic resonance imaging and event-related potential on early visual functions. After he joined the faculty of National Taiwan University, his main research focus has been on the effects of long-range interactions between image elements on the responses of human visual system. He developed several computational models to explain how the visual system organizing separated image elements into coherent objects.



Shuichi Sakamoto

Professor, Research Institute of Electrical Communication
and Graduate School of Information Sciences,
Tohoku University, Sendai, Japan

Talk: Directional Dependence of Auditory Spatial Processing

Abstract

Auditory spatial processing is known to vary with sound-source direction. This presentation introduces direction-dependent characteristics observed in a variety of auditory tasks in the horizontal plane. Particular attention is given to differences between frontal and rear directions, which have been reported across multiple aspects of auditory perception and perceptual organization. Such directional asymmetries suggest that auditory processing is not uniform across space and may depend on how spatial information is represented and utilized by the auditory system. Although these phenomena have often been investigated independently, they may reflect common constraints and mechanisms underlying human spatial hearing. By examining findings from different research areas from a unified perspective, the presentation highlights common patterns of directional dependence in human spatial hearing and discusses their relevance to understanding spatial auditory perception.

Biography

Shuichi Sakamoto received his B.S., M.S., and Ph.D. degrees from Tohoku University in 1995, 1997, and 2004, respectively. He is currently a Professor at the Research Institute of Electrical Communication, Tohoku University. He was a Visiting Researcher at McGill University, Montreal, Canada, from 2007 to 2008 and an Honorary Associate at the University of Sydney, Australia, in 2017.

His research interests include auditory and multisensory perception, speech perception, and high-definition 3D audio recording systems. He is a Vice President of the Acoustical Society of Japan (ASJ) and a member of the Acoustical Society of America (ASA), the Institute of Electronics, Information and Communication Engineers (IEICE), the Virtual Reality Society of Japan (VRSJ), and other professional societies.

Moderator



Nobuyuki Sakai

Department of Psychology SAL.
Yotta Informatics Research Center,
Tohoku University, Sendai, Japan

Biography

Prof. Sakai is a professor of Department of Psychology, Tohoku University. He graduated from Graduate School of Human Sciences, Osaka University in 1998 and received PhD degree for the study about behavioral neuroscience on learning and eating behavior in rats. Then he worked at Hiroshima Shudo University and National Institute of Advanced and Industrial Science and Technology (AIST) as post-doc. He was an associate professor in Kobe Shoin Women's University and taught eating psychology for registered dietitians and for students in home economics. He moved to Sendai in October 2011, and keeps studying sensory science, multimodal flavor perception, and consumer psychology. He is serving as an Academic Editor of the Plos One, the Foods, the Nutrition, the Frontiers in Nutrition, the Japanese Journal of Health Psychology, and the Tohoku Psychologica Folia. He is also a board member of the Japanese Association for Studying Taste and Smell, and the councilor of the Japanese Psychological Association. He is also acting as a director of Society for Research on Umami Taste and organizing some events for appealing the function of the Japanese Cuisine (Washoku) and Umami Taste.



Yong Song Huang

Assistant Professor, Advanced Institute of Convergence Knowledge (So-Go-Chi) Informatics, Tohoku University, Japan

Talk: From Vision to Experience: Exploring Art, Smell, and Emotion through Human–AI Collaboration

Abstract

This talk will introduce a proposed human–AI framework for exploring visual, olfactory, and emotional associations in paintings. The framework separates observable visual evidence from subjective interpretation. Multiple AI agents would work together to generate alternative association hypotheses, explain their visual basis and uncertainty, and support people in accepting, rejecting, or revising them. The aim is not to determine a person's emotions or reproduce human cognition, but to make the interpretation process more transparent while preserving human judgment.

Biography

Yongsong Huang received the B.E. and M.E. degrees from Guilin University of Electronic Technology, Guilin, China, in 2018 and 2021, respectively, and the Ph.D. degree from Tohoku University, Sendai, Japan, in 2025. He was a JSPS Research Fellow and has held visiting researcher positions at Harvard University, Cambridge, MA, USA; Massachusetts General Hospital, Boston, MA, USA; and National Taiwan University, Taipei City, Taiwan. He is an Assistant Professor at the Advanced Institute of Convergence Knowledge (So-Go-Chi) Informatics, Tohoku University. He is a co-author of the book Applications of Generative AI (Springer). His research interests include computer vision, data science, and pattern recognition. Dr. Huang was awarded the JSPS Special Research Grant Allowance in 2024, the RIEC Award 2025, and the ECEI Excellent Young Researcher Award 2026.



I-Hui Hsieh

Associate Professor, Music and Auditory Cognition Laboratory,
Institute of Cognitive Neuroscience,
National Central University, Taiwan

Talk: Absolute Pitch, Autistic Traits, and Audiovisual Speech Perception in Noisy Environments

Abstract

This talk focuses on one line of our research on music and cognitive functions: how a genetic musical trait affects multisensory speech processing. Multisensory cues (e.g., sound, lip movements) provide benefits to speech perception particularly in challenging listening environments. Musicians have been thought to benefit more from audiovisual cues because of the inherently multisensory nature of music training. Contrary to the multisensory advantage often reported in musicians, here we show that absolute pitch, a genetic trait related to musicianship, hinders the integration of auditory and visual cues during speech perception in noisy contexts. Additionally, we found that reduced multisensory integration in absolute pitch listeners was associated with cognitive styles and neural mechanisms linked to autism. These findings have important implications for designing multisensory-based interventions to improve speech perception in noisy environments.

Biography

I-Hui Hsieh is an Associate Professor at the Institute of Cognitive Neuroscience at National Central University in Taoyuan, Taiwan. She received her B.S. in Psychology from Grove City College in Pennsylvania in 2003 and her M.S. and Ph.D. degrees from the University of California-Irvine, in 2005 and 2007, respectively. Her research focuses on music cognition and neuroscience, particularly how musicianship and musical features influence human cognitive functions. She aims to develop music-based interventions to improve speech/language outcomes and related cognitive functions. Having played the piano and violin since childhood, she is delighted to combine her passion for music with her research.



Doris Chow

Associate Professor, Psychology,
St. Thomas University, Canada

Talk: Crossmodal Correspondences in the Lab and Beyond

Abstract

Humans and non-humans alike associate certain properties across the senses, even though some of these associations might appear puzzling at first. For example, nonsense words such as ‘bouba’ are more often associated with rounded shapes and smooth texture. In contrast, nonsense words such as ‘takete’ are more often associated with pointy shapes and rough texture. Although these associations are widely reported, they can be sensitive to task context (how shapes are shown) and participants' prior experience (what participants have seen before), especially in younger children, implying that these associations are multi-faceted, warranting further investigation. Building on prior work, my lab recently tested a possible explanation for some of these associations: touching abstract shapes evokes visual imagery of the shapes, which participants then associate with nonsense words (image-mediation hypothesis). To test this link, we evaluated whether the strength of the tactile-sound associations was related to self-reported visual imagery abilities in college-age participants. Our results show no association between the two, which does not support the image-mediation hypothesis. Future directions for deepening our understanding of this topic will be discussed.

Biography

Doris Chow received a PhD in Developmental and Brain Sciences from the University of Massachusetts Boston (USA) and completed postdoctoral training at the University of British Columbia Vancouver (Canada). Since 2022, she has been a faculty member at St. Thomas University, a small liberal arts university in Canada focused on undergraduate education. Members of her research laboratory conduct experimental research to understand how human participants respond to, interpret, and remember information from different senses. Her work ranges from eye-tracking experiments in a highly controlled lab setting to community-based studies for children and families visiting science museums.



Watanee Jearanaiwongkul

Advanced Institute of So-Go-Chi (Convergence Knowledge) Informatics,
Tohoku University, Japan

Talk: Reliable Explainable AI through Knowledge Integration

Abstract

Large EEG Model (LEM) is the pretrained EEG models that Brain Science Researchers use to analyze EEG data. NeuroLM and LaBraM are the most unified and generative LEM models suitable for analyzing various tasks in EEG. Although current LEMs achieved the promising scores but still lack of reasoning ability. So, the model can't explain the "how" and "why" behind AI results. Providing reliable explanation is matter in brain science since it is vital to human life. I'm an AI scientist who specialist in Explainable AI using many Knowledge Representation and Reasoning techniques. Therefore, I propose the development of our ReLEM framework that provides the reasoning ability (thus, reliable explanation) along with the EEG data analysis ability. ReLEM designs to balance between AI performance and AI transparency, with less hallucination.

Biography

WATANEE JEARANAIWONGKUL is an assistant professor at the Advanced Institute of So-Go-Chi (Convergence Knowledge) Informatics, Tohoku University. She received the B.S. degree in Information Technology from Sirindhorn International Institute of Technology (SIIT), Thammasat University, the M.S. and Ph.D. degrees in Information Management from Asian Institute of Technology (AIT), Thailand. Her research interests include ontology learning, knowledge representation and reasoning, knowledge-based system, and knowledge representation-based explainable AI.

Moderator



Yumi Hamamoto

Frontier Research Institute for Interdisciplinary Sciences,
Tohoku University, Japan

Biography

Yumi Hamamoto received her bachelor's degree in Science, master's and PhD degrees in Medical Science from Tohoku University, Sendai, Japan, in 2016, 2018, and 2022, respectively. After her postdoc at Northumbria University, Newcastle upon Tyne, UK, from 2022 to 2024, she was appointed to the current position as an assistant professor at the Frontier Research Institute for Interdisciplinary Sciences (FRIS), Tohoku University, Japan. She has researched body image disturbance using functional magnetic resonance imaging (fMRI). She is conducting several research projects regarding measurement/manipulation of body image disturbance using virtual reality (VR).

She received the Best Poster Award at the 22nd Congress of Japan Human Brain Mapping Society in 2020, the 30th IDAC Young Investigator Award in 2023, and the Seal of Excellence for MSCA Postdoctoral Fellowships 2023 in 2024.



Hyeonjeong Jeong

Professor, Graduate School of International Cultural Studies,
Tohoku University, Japan

Talk: Multimodal and Embodied Language Learning in the Age of AI

Abstract

Language learning is shaped by social interaction, multisensory experience, and the coupling of perception and action. This talk draws on behavioral and functional magnetic resonance imaging (fMRI) studies of second language learning to explore how these processes can inform AI-supported language learning. Findings show that learning words in simulated social contexts supports transfer to new situations and engages social, motor, and memory systems. Social experience is associated with neural responses to emotional words, while seeing a speaker's face improves accuracy in speech repetition (shadowing) and engages systems involved in audiovisual integration, memory, and motivation. These findings suggest that effective learning environments should integrate linguistic input with meaningful social and embodied experiences. By manipulating facial cues, gestures, prosody, and responsiveness in artificial agents and combining behavioral and neural measures, we can investigate which features support learning and develop evidence-based approaches to designing AI partners for language education.

Biography

Hyeonjeong Jeong is a Professor at Tohoku University's Graduate School of International Cultural Studies in Japan and is affiliated with the Department of Human Brain Science at its Institute of Development, Aging, and Cancer. Her research examines the neural mechanisms of language processing and second language acquisition, particularly the roles of context, nonverbal cues, and social interaction. Her work has appeared in journals including Human Brain Mapping, Language Learning, and NeuroImage. She is an editorial board member of Brain and Language and Annual Review of Applied Linguistics.



Yuki Murai

Tenure-track Researcher, Center for Information and Neural Networks (CiNet),
National Institute of Information and Communications Technology (NICT), Japan
Guest Associate Professor, Graduate School of Frontier Biosciences,
The University of Osaka, Japan

Talk: How We See What Others Feel: Context, Body Movement, and the Individual Observer

Abstract

Emotion perception is usually studied with isolated faces; in natural scenes, observers judge a person's emotion by integrating facial information with context—most weighting each cue by its reliability, as a Bayesian model predicts, some simply averaging them (Ortega, Murai & Whitney, 2025, Nat Commun). These models treat the person as a single cue, leaving unspecified which visual information carries the emotional/social signal. The body is a natural starting point, visible where the face is not, and the properties of its movement—speed, acceleration, posture—can be measured and related to perceived emotion. I will outline ongoing behavioral and neuroimaging work asking which properties observers rely on, how they weight them, and whether this varies across individuals as it does for context. Computational models predicting perceived emotion from measurable body and scene properties would specify what an artificial system must extract from a person to read emotion as humans do.

Biography

Yuki Murai is a tenure-track researcher at the Center for Information and Neural Networks (CiNet), National Institute of Information and Communications Technology (NICT), Japan. He received his Ph.D. in Behavioral and Cognitive Sciences from the University of Tokyo in 2017 and subsequently conducted postdoctoral research in the Department of Psychology at the University of California, Berkeley. His research focuses on human perception, particularly how contextual information and recent experience shape perceptual judgments. He combines psychophysics, computational modeling, and neuroimaging to study visual perception and its individual differences. His recent work extends this approach to social perception, examining how people perceive the emotions and intentions of others from faces, bodies, and the surrounding scene.



Toru Nagahama

Associate Professor, Graduate School of Information Sciences,
Tohoku University, Japan

Talk: From Clicks to Copresence: Making Invisible Learning Visible Again

Abstract

This talk explores how learning analytics can help teachers see learning processes that would otherwise remain invisible. In face-to-face classrooms, teachers notice how students learn through their facial expressions, gaze, and gestures, a capacity grounded in copresence. When learning moved online, this view was lost, and learning analytics emerged as an attempt to rebuild it from digital traces. We first present studies of learners' operation logs in online learning environments, showing how such traces can capture moments of difficulty that outcomes alone conceal. We then turn to eye movements, which reveal individual differences in how learners attend to accelerated video. Finally, we discuss tangible XR and metaverse learning environments that restore bodily presence across time and space. Richer traces, however, do not guarantee deeper understanding. In the age of generative AI, we argue that analytics should extend, rather than replace, teachers' noticing of students' growth.

Biography

Toru Nagahama is an Associate Professor in the Graduate School of Information Sciences at Tohoku University, Sendai, Japan. He received his Ph.D. in Human Sciences from Waseda University. Before joining Tohoku University in 2021, he worked at Waseda University and Tokyo Institute of Technology (now Institute of Science Tokyo). He has been conducting research on learning analytics, instructional media design, individual differences in online learning, formative assessment, self-regulated learning, programming education, etc.



Teeradaj Racharak

Advanced Institute of So-Go-Chi (Convergence Knowledge) Informatics,
Tohoku University, Japan

Talk: Can We Trust What AI Tells Us? Making AI Explain Itself

Abstract

Artificial intelligence (AI) increasingly makes decisions that affect people's lives, from screening job applications and reading medical images to assessing risk in courtrooms. Yet even when these systems are accurate, they often cannot tell us why they reached a decision. In this talk, I will introduce my research on trustworthy AI through three simple questions that we can ask of any AI system: Can it explain itself? Is it fair? Does it behave consistently? Using intuitive examples from my study, I will show how an AI can be right for the wrong reason, how we can look inside an AI's "brain" to find the concepts it has learned, how an AI can explain its decision as a conversation that people can challenge, how AI can absorb human stereotypes from its data, and how small changes in wording, such as adding the word "not", can confuse even large language models. A central lesson is that no single explanation works for everyone: whether an explanation is useful depends on who receives it. This is fundamentally a question about people, not only about algorithms. I will therefore close by outlining concrete opportunities for collaboration with psychologists, neuroscientists, and artists, for example, studying which explanations people understand and trust, comparing the concepts inside AI models with responses in the human brain, and turning AI explanations into visual and interactive works.

Biography

Teeradaj RACHARAK is an associate professor at the Advanced Institute of So-Go-Chi (Convergence Knowledge) Informatics, Tohoku University, and a visiting associate professor at the School of Information Science, Japan Advanced Institute of Science and Technology (JAIST). He holds two Ph.D. degrees, one in description logic and one in formal argumentation. Before joining academia, he worked for three years in the software industry as a software engineer and AI consultant. He is a technical committee member of ISO/IEC JTC 1/SC 42, the international committee responsible for standardization in artificial intelligence, and a co-editor of the book Standards-Based AI Innovation for the Learning Ecosystem (IGI Global). His research interests include explainable AI, knowledge representation and reasoning, formal argumentation, machine learning, and trustworthy AI.



Satoshi Shioiri

Professor, Advanced Institute of So-Go-Chi Informatics,
Tohoku University, Sendai, Japan

Talk: Audiovisual Interaction of Spatial Attention

Abstract

Cross-modal attention between visual and auditory perception has been widely reported. To understand the underlying mechanisms of cross-modal attention, we estimated the spatial distribution of attentional modulation in visual and auditory processing using EEG measurements of steady-state visual evoked potentials (SSVEPs) and auditory steady-state responses (ASSRs). SSVEPs and ASSRs were analyzed for visual and auditory stimuli that were temporally modulated at different frequencies across locations surrounding the attentional focus. The amplitudes of SSVEPs and ASSRs varied depending on the distance from the attentional focus, demonstrating spatial tuning of attentional modulation. Furthermore, we identified the spatial profile of the effect of auditory attention on visual processing, as well as that of visual attention on auditory processing. These results indicate the existence of a common attentional process with a spatial representation that integrates visual and auditory signals.

Biography

SATOSHI SHIOIRI received the B.S. degree in mechanical engineering from Tokyo Institute of Technology, in 1981 and the M.S. and PhD. degrees in Physical Information Engineering from Tokyo Institute of Technology, in 1983 and 1986. From 1986 to 1989, he was a postdoctoral fellow at University of Montreal, from 1989 to 1990 he was a postdoctoral fellow at Advanced Telecommunications Research Institute International, Kyoto. He was an assistant professor, an associate professor, and professor in Chiba University from 1990 to 2004. He has been a professor in Tohoku University since 2004. His research interests include motion perception, depth perception, color perception, visual attention, eye movement and vision for action.

Moderator



Kowa Koida

Professor, Research Institute of Electrical Communication,
Tohoku University, Sendai, Japan

Biography

Kowa Koida received his B.S., M.E., and D.E. degrees from the Tokyo Institute of Technology (Dr. Keiji Uchikawa's laboratory) in 1995, 1997 and 2000, respectively. He served as a post-doctoral researcher and assistant professor at the National Institute of Physiological Sciences, Okazaki (Dr. Hidehiko Komatsu's laboratory) from 2000 to 2009. In 2010 he joined the Toyohashi University of Technology in Toyohashi as an Associate Professor, remaining there until 2025. Since 2025 he holds a position at the Research Institute of Electrical Communication, Tohoku University, Sendai, Japan.

His research focuses on the neural mechanisms of colour vision. He employs human psychophysics, electrophysiological experiments in macaque monkeys, image analysis, and optical simulation as his methodology.

In addition to his research, he is actively involved in academic service: he has been a Council Member of the Asia–Pacific Conference on Vision (APCV) since 2016, and organized the 15th APCV meeting in Osaka in 2019; he has also served as Secretary-Officer of the Vision Society of Japan (since 2014) and as Director of the Vision Science Forum Japan (since 2020).

Poster Session



Chia-Ching Wu

Research Fellow, Department of Psychology,
National Taiwan University, Taiwan

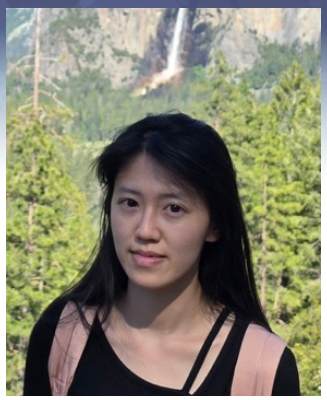
Talk: Mapping Deep-Network Layers onto Human Visual Cortex

Abstract

Deep convolutional neural networks (dCNNs) are widely used as models of the human ventral visual stream, and several studies report a hierarchical correspondence: early visual areas resemble shallow network layers, and higher areas resemble deeper layers. We asked how robust this correspondence is across datasets and analysis choices. In the Natural Scenes Dataset (NSD; 7T fMRI), we first followed the voxel-wise encoding procedure of Lin et al. (2024) and observed the expected ordering in all eight participants: V1 mapped onto shallow layers, V2 and V3 onto progressively deeper layers, and face-, body-, place- and word-selective areas onto the deepest layers. In one participant, we then replaced one analysis component at a time with our own pipeline (VGG16 convolutional layers, smaller image sets, and a different readout and layer selection); the ordering was preserved at every step tested so far. In contrast, in BOLD5000 (3T fMRI), V1 resembled deep VGG16 layers (layers 9–11 of 13), whereas in NSD, on images shared by both datasets, it resembled layers 4–5. These results are exploratory and based on development data only. We are now testing whether the NSD procedure also recovers a hierarchy in BOLD5000.

Biography

Chia-Ching Wu is a Research Fellow in the Department of Psychology, National Taiwan University. She received her Ph.D. in Psychology from National Taiwan University and was an Assistant and then Associate Professor of Psychology at Fo Guang University (2011–2023). Her background is in visual perception and cognitive neuroscience, including symmetry perception and visual aesthetic preference. She currently studies how deep neural network representations relate to brain responses in human visual cortex.



Cheng-Hsuan Chen

Ph.D. Student, National Taiwan University, Taiwan

Talk: The Contribution of Facial Features to Attractiveness Judgments: Evidence for Analytic Processing

Abstract

Face recognition is understood to involve holistic processing, in which faces are processed based on the spatial relationships between facial features rather than individual components alone. However, it remains unclear whether facial attractiveness judgments rely on the independent evaluation of individual facial features or their configuration. We used a composite face paradigm to investigate this question. We created a stimulus set by morphing faces between original and averaged faces as well as caricatures created by extrapolating beyond the average. The faces were then divided into upper and lower halves and recombined to create composite faces with varying degrees of attractiveness in each half. Participants judged attractiveness based on three criteria: the upper half, the lower half, or the whole face. When participants were asked to judge a specific half, ratings were influenced only by the morphing level of that half. For whole-face judgments, attractiveness ratings reflected a combination of evaluations of the upper and lower halves. Using a model derived from multidimensional signal detection theory, the analysis revealed only minor interaction between the two halves of the faces. Both lower and upper faces contributed to attractiveness judgments, with a greater emphasis on the upper face. The findings demonstrate that facial attractiveness judgments are primarily analytic rather than holistic, contrasting with the holistic face recognition processes. These results help resolve conflicting findings in existing literature by showing that attractiveness judgments involve predominantly independent processing of facial features, with limited interaction between them. More broadly, these findings provide insight into the cognitive mechanisms underlying human face perception.

Biography

Cheng-Hsuan Chen is a Ph.D. student in the Department of Psychology at National Taiwan University, Taipei, Taiwan. She holds master's degrees in Psychology and Foreign Languages and Literature. Her research focuses on vision science and aesthetics, particularly in the fields of color perception and face perception. Her current research investigates how color combinations and visual context influence aesthetic judgments and shape our perception of beauty.



Yu-Sin Kuo

Research Assistant, National Taiwan University, Taiwan

Talk: Effects of Depth Cues on the Perception of Second-Order Symmetry

Abstract

It is reported that an observer can detect symmetry without correspondence between image elements across the symmetry axis, but rather through changes in image statistics across space (Chen & Tyler, 2023). This kind of symmetry perception has been termed second-order symmetry, and its underlying mechanism remains unknown. Since dot density does not affect the first-order symmetry detection but the second-order symmetry (Chen & Tyler, 2023), suggesting that second-order symmetry perception is associated with surface completion. We investigated how depth modulation affects the perception of second-order symmetry. The stimuli consisted of grayscale scrambled pattern multiplied by an envelope that modulated luminance contrast. 6 kinds of binocular disparity depth cues were used to present the stimulus. We used a PSI staircase method to measure the modulation depth threshold at 75% accuracy for symmetry discrimination. Unlike in the first-order symmetry patterns, where symmetry perception diminishes when the inflection of the surface is not consistent with the symmetry axis (Chen & Sio, 2015), it was easier for observers to detect symmetry when the two sides of the symmetry axis were on different surfaces. The vertical hinge improved the sensitivity by 30% to the first order symmetry but only 11% to the second order symmetry. These results suggest that second-order symmetry perception appears to involve a different surface completion mechanism from that of first-order symmetry.

Biography

Yu-Sin Kuo graduated with a degree in Psychology from National Taiwan University. Her research interests include visual perception, psychophysics, and early vision. Her undergraduate research focused on second-order symmetry perception and the effects of depth cues on visual perception. She has experience in psychophysical experimentation, and computational modeling of contrast sensitivity functions.



Ruiling Guo

Master's Student, Graduate School of Information Sciences (GSIS),
Tohoku University, Japan
Co-authors: Xiaoyue Yang, Victor Schneider, Miao Cheng, Chia-huei Tseng

Talk: Gender Bias in Judging Full-Body Movements in Humans and AI

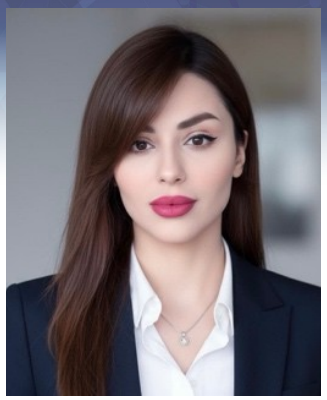
Abstract

People can recognize a person's gender from body movements, even from point-light displays. However, this ability is influenced by emotion and our default gender mental representation. Previous studies reported that people tend to judge ambiguous bodies and angry movements as male. The bias has inevitably affected the gender stereotype representation in current AI models, which raises a lot of concerns about fairness and trustworthiness. Here we investigated this topic with body motion animations without appearance or contextual information. We used 540 point-light animations of 36 Taiwanese performers (17 women, 19 men) expressing five social emotions: gratitude, guilt, jealousy, pride, and shame. We asked 53 participants and 3 AI models (2 zero-shot vision-language models (VLMs), Gemini 3.8 Flash and Qwen3-VL-8B, and 1 graph neural network, STGCN++) to judge the emotion and gender of each animation. We observed a male bias in human participants and all AI models: female performers were often judged as male (humans 41%, STGCN++ 42%, Gemini 66%, Qwen 62%), whereas male performers were less often judged as female (26%, 27%, 25%, and 37%). This bias was linked to emotion. Pride showed the biggest male bias for humans and VLMs, and STGCN++ showed the biggest male bias for shame. The large variation among AI models in how human-like their gender judgments were, and the variation of this bias across emotions, point to directions for building fair emotion recognition systems. This raises a key question: since humans themselves are biased, should AI aim to be human-like, or fairer than humans?

Biography

Ruiling Guo is a first-year master's student at the Graduate School of Information Sciences, Tohoku University, Sendai, Japan, in the Visual Information System Lab under the supervision of Professor Chia-huei Tseng. Her research lies at the intersection of affective computing and human perception, focusing on how people and AI models recognize emotion and gender from full-body movements.

Poster Session



Zahra Davoudi

Ph.D. Candidate, Graduate School of Arts and Letters
Tohoku University, Japan

Talk: Painting with Odors: Odor, Color, and Object Choice

Abstract

Odors are known to influence emotion and perception, but do they also shape what people create? This poster presents our study, published in PLOS ONE (2026), on how odors are expressed in painting. In Study 1, 24 participants smelled strawberry and rose odors on separate days and painted what they perceived. Strawberry paintings were dominated by warm colors (yellow, pink, and orange), whereas rose paintings were dominated by cool colors (blue and green). Sixty observers who did not know the odors judged the strawberry paintings as warmer, lighter, and more positive. In Study 2, 60 participants entered a room scented with strawberry, rose, or no odor, without being told about the scent, and chose one of five artificial objects to paint. The odor strongly guided their choice: strawberries and lemons dominated in the strawberry room and white roses in the rose room, while choices in the unscented room were more varied. Together, these findings show that odors shape color use, the impressions paintings convey to others, and what people choose to depict.

Biography

Zahra Davoudi is a Ph.D. candidate in the Department of Psychology, Graduate School of Arts and Letters, Tohoku University, Sendai, Japan, supervised by Professor Nobuyuki Sakai. Her research examines how odor shapes visual experience: how odors are expressed in color and painting, how they affect emotional and physiological states. She combines painting tasks and observer evaluations with physiological measures and computational image analysis. She is also a practicing oil painter and art educator with more than ten years of experience, and she founded and managed an art gallery in Gorgan, Iran.

Poster Session



Hyoungsun Kim

Ph.D. Student (D3), Graduate School of International Cultural Studies,
Tohoku University, Japan

Talk: Anger Boils in the Gut but Not the Heart: An fMRI Study of How Language Conveys Bodily Location of Visceral Feelings of Emotion

Abstract

Embodied theories propose that understanding language involves the partial reinstatement of bodily and sensorimotor states associated with the described action or experience. In principle, this framework extends to emotional experience, primarily embodied through interoception or the sensing of signals from the viscera. However, compared to exteroceptive and action-related sensorimotor simulation, neural evidence for interoceptive reinstatement through language remains scarce. Given that reinstated bodily feelings should preserve information of their bodily location, the present study investigates whether the neural representations recruited by language expressions preserve this information structure. We employ multivoxel pattern-based classification analysis to investigate whether the neural distinction between cardiac and gastric sensations learned from an interoceptive attention task generalizes to neural activity patterns elicited during the comprehension of figurative language. We examine two types of expressions: those with explicit (e.g., anger was boiling in my gut) and implicit reference to a bodily location (e.g., my anger was boiling). Here, implicit reference arises from culturally entrenched associations of particular emotions and the bodily source of their feelings in Japanese, namely of sadness to the heart and anger to the stomach.

Biography

Hyoungsun Kim is a PhD student in the Graduate School of International Cultural Studies at Tohoku University, Sendai, Japan. She received her B.A. and M.A. degrees in English Linguistics from Hanyang University (Seoul, Korea). She has been conducting research on neurolinguistics and affective neuroscience using EEG, fMRI, and psychophysiological measures.



Pierre Jouffroy
Research Student, Tohoku University, Japan
Former Intern, LIRIS, Université Claude Bernard Lyon 1, France

Talk: Lighting and Emotion in Virtual Reality: Key Lighting and Color Grading

Abstract

Virtual reality is increasingly used to showcase cultural heritage, yet little is known about how lighting, one of the strongest drivers of perceived atmosphere, shapes the user's emotional experience. This talk presents a user study conducted at the LIRIS laboratory (Lyon, France) on how two lighting parameters, key lighting (high-key vs. low-key) and color grading (warm vs. cool), affect emotional responses in an immersive Victorian-era environment. Forty-seven participants wearing an Apple Vision Pro explored five rooms, each differing from the previous one by a single lighting parameter, while searching for a hidden object. We combined subjective self-reports (Self-Assessment Manikin, presence, embodiment, workload and cybersickness questionnaires) with objective measures: electrodermal activity, heart rate variability and head movements. Results show that lighting significantly affects perceived valence, and that key lighting is the main driver: low-key rooms were rated much less pleasant than high-key rooms and elicited higher tonic electrodermal activity and greater head-pitch variability, suggesting a more effortful, searching exploration. Warm grading was preferred over cool grading, but with a smaller effect, and neither factor changed self-reported arousal; heart rate variability showed no effect. These findings are a first step toward evidence-based lighting guidelines for XR applications, especially in cultural heritage, where lighting could be used to deliberately shape the user's emotional journey.

Biography

Pierre Jouffroy did his Master's in Image and 3D at the University of Strasbourg, France. He carried out his Master's research internship (February–July 2026) in the ORIGAMI computer graphics team of the LIRIS laboratory in Lyon, France, under the supervision of Jean-Philippe Farrugia, where he designed and conducted a virtual reality user study on the emotional impact of lighting. His research interests include virtual reality, visual perception, affective computing and the use of physiological and behavioral signals to evaluate user experience.

Poster Session



Lee Lin

Ph.D. Student, Graduate School of Science and Engineering
(with Prof. Ichiro Kuriki), Saitama University, Japan
Co-authors: Yusuke Ishihara, Kenichi Ueno, Ichiro Kuriki

Talk: Color Representations in Human Cortex Studied by fMRI Adaptation: Technique with Two Types of Color Perception Tasks

Abstract

We can discriminate millions of color shades while describing them using a limited set of color terms. These abilities reflect two aspects of color vision: the continuous perception of color appearance and the discrete categorization of colors. In the present study, we investigated how cortical color representations underlying these aspects are modulated by task demands using an fMRI adaptation paradigm. We presented spiral patterns in 10 hues spanning the blue-green boundary in CIELAB space. Participants performed a color-appearance judgment task, deciding whether the current stimulus appeared bluer or yellower than the preceding one, as well as color categorization and diverted-attention tasks. The results revealed enhanced responses to hues near the color-category boundary exclusively during the categorization task. In addition, brain responses generally increased monotonically with the hue difference between successive stimuli, although the shape of the response function varied across tasks. These findings suggest that cortical color representations are modulated by task demands that engage different aspects of color vision.

Biography

Lee Lin is a doctoral student at the Graduate School of Science and Engineering, Saitama University, Saitama, Japan, under the supervision of Professor Ichiro Kuriki. His research focuses on how task demands targeting different aspects of color perception modulate cortical color representations, using functional magnetic resonance imaging (fMRI).



Aiki Humeau

Master's Student, Graduate School of Information Sciences (GSIS),
Tohoku University, Japan
Co-authors: Victor Schneider, Miao Cheng

Talk: Benchmarking Skeleton-Based Deep Learning Models for Emotion Recognition on an Emotion-Labeled Human Motion Dataset (DIEM-A: Diverse Intercultural E-motion Database of Asian Performers)

Abstract

This poster presents the first systematic benchmark of skeleton-based deep learning for emotion recognition on DIEM-A, a new motion-capture corpus of 10,000+ sequences across 13 emotions and three intensity levels. 11 deep architectures (GCNs, transformers, and baselines) are evaluated against handcrafted features and human observers under actor-disjoint cross-validation. We find that architecture matters little: all models score within one to two macro-F1 points and share the same difficulty hierarchy. The difficulty appears intrinsic to the task: the clips models fail on are the ones humans fail on too and both confuse the same emotion. The one intervention that helps is ensembling, which reaches human-level accuracy.

Biography

Aïki Humeau is a first-year master's student at the Interactive Content Design Lab at Tohoku University, where he is completing a double degree with Centrale Lyon, France, following his engineering studies there. His research applies deep learning to the analysis of emotional body motion.



Yuto Ogata

Master's Student, Tohoku University, Japan

Talk: StereoBrake: Towards Mitigating VR Sickness by Suppressing Stereopsis with a 2D Projection

Abstract

Virtual reality (VR) sickness remains a critical barrier to ensuring comfortable and sustained user experiences. To address this issue, we propose "StereoBrake", a novel dynamic stereopsis control system designed to mitigate sickness during virtual locomotion without obstructing the user's field of view (FOV). Our approach modulates binocular disparity based on user movement. Specifically, it restricts stereopsis during locomotion to suppress sickness and lifts this restriction during stationary periods to restore full stereoscopic vision. We conducted a within-subjects user study to evaluate the efficacy of the proposed system, comparing a control condition, a continuous stereopsis restriction condition, and the StereoBrake approach. The results demonstrated that StereoBrake successfully maintained the participants' sense of presence without significant degradation. Although the current system did not significantly mitigate sickness on its own, StereoBrake demonstrates strong potential for further investigation and methodological evolution toward achieving a more robust VR experience.

Biography

Yuto Ogata is a master's student at the Graduate School of Information Sciences, Tohoku University, Japan. His research interests include Human-Computer Interaction (HCI) and Virtual Reality (VR). His research focuses on improving user experiences in immersive virtual environments, particularly through the development and evaluation of techniques for mitigating VR sickness.

Poster Session

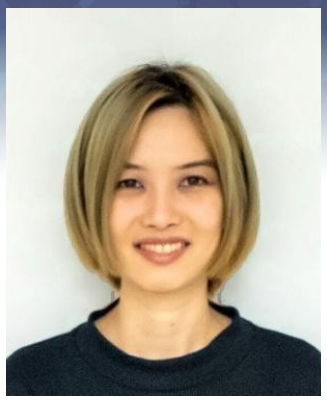
Photo

Kanta Ozawa

Talk: Contextual Effects on AI-Based Affective Recognition from Human Whole-Body Movements

Abstract and biography to be provided.

Moderator



Miao Cheng

Associate Professor,
Research Institute of Electrical Communication,
Tohoku University, Sendai, Japan

Biography

Miao Cheng received the PhD degree in Psychology from the University of Hong Kong in 2018. She is currently an associate professor at the Research Institute of Electrical Communication and Interdisciplinary ICT Research Center for Cyber and Real Spaces at Tohoku University. Her research focuses on nonverbal communication, with a special interest in how social cues (e.g. emotion, friendliness, interpersonal impression) are expressed through body movements and eye movements. Her long-term goal is to bridge cognitive science & neuroscience with human–computer interaction & computational modeling, to uncover how variations in nonverbal behavior shape both digital and face-to-face communication.



Brown Po-Jang Hsieh

Department of Psychology,
National Taiwan University, Taiwan

Talk: The Scientific Study of Human Consciousness

Abstract

Scientific studies of consciousness can be broadly organized around two questions: (1) How and where does consciousness emerge? and (2) Why is there consciousness? The first concerns the biological mechanisms underlying conscious experience, particularly the neural correlates of consciousness. These can be investigated by examining altered states of consciousness, such as sleep and disorders of consciousness, or changes in conscious content while sensory input remains constant, as in bistable perception and visual illusions. The second concerns the functions of consciousness: which cognitive processes require conscious awareness, and which can operate without it? In this talk, I will summarize my past research along these two directions, drawing on behavioral experiments and neuroimaging to explore the neural bases of subjective experience and the capabilities and limits of unconscious processing.

Biography

Po-Jang (Brown) Hsieh is a cognitive neuroscientist studying consciousness, perception, attention, and unconscious processing. His research examines how conscious experience arises from neural activity, how unseen information influences cognition and behavior, and how pre-existing brain states shape perception and decision-making. He uses psychophysics, EEG/MEG, and fMRI, including multivariate decoding. Hsieh earned a B.S. from National Taiwan University, an M.A. in Philosophy of Mind and Cognitive Science from National Chung Cheng University, and a Ph.D. in Cognitive Neuroscience from Dartmouth College. After postdoctoral training in Nancy Kanwisher's lab at MIT and serving as Assistant Professor at Duke-NUS Medical School, he joined National Taiwan University, becoming Professor in 2023. His work has appeared in Nature Neuroscience, Psychological Science, NeuroImage, Cortex, and Communications Biology.



Yasuhisa Hirata
Professor, Department of Robotics,
Tohoku University, Japan

Talk: Empowering People through Human-Centered AI Robotics: Encouraging Challenge and Social Participation

Abstract

As AI and robotics technologies increasingly enter daily life, care, and social spaces, a critical question arises: how should technology support humans without causing passive dependence? This talk explores a human-centered vision of AI robotics that shifts the focus from purely task-based assistance to empowering individuals and fostering active social participation. Drawing on research from Japan's Moonshot R&D Program, we discuss how adaptable AI-enabled robots can respond to individual physical abilities, motivations, and goals. A key highlight of this talk is the "Yes We Dance!" project as a concrete real-world case study, demonstrating how human-centered robotics can bridge the gap between laboratory technology and inclusive social engagement.

Biography

Yasuhisa Hirata is a Professor in the Graduate School of Engineering at Tohoku University, Sendai, Japan. He received his B.E., M.E., and Ph.D. degrees in mechanical engineering from Tohoku University in 1998, 2000, and 2004, respectively. His research interests include human–robot interaction, human-centered AI robotics, multi-robot coordination, and assistive technology. He served as a Project Manager for Japan's Moonshot R&D Program, aiming to shape a future society where humans and robots co-exist and empower people. He has also served as an Administrative Committee (AdCom) member of the IEEE Robotics and Automation Society (RAS) and currently serves as Chair of the IEEE RAS Technical Committee Cluster on Health and Medical Robotics.

Moderator



Shuichi Sakamoto

Professor, Research Institute of Electrical Communication
and Graduate School of Information Sciences,
Tohoku University, Sendai, Japan

Biography

Shuichi Sakamoto received his B.S., M.S., and Ph.D. degrees from Tohoku University in 1995, 1997, and 2004, respectively. He is currently a Professor at the Research Institute of Electrical Communication, Tohoku University. He was a Visiting Researcher at McGill University, Montreal, Canada, from 2007 to 2008 and an Honorary Associate at the University of Sydney, Australia, in 2017.

His research interests include auditory and multisensory perception, speech perception, and high-definition 3D audio recording systems. He is a Vice President of the Acoustical Society of Japan (ASJ) and a member of the Acoustical Society of America (ASA), the Institute of Electronics, Information and Communication Engineers (IEICE), the Virtual Reality Society of Japan (VRSJ), and other professional societies.



Pi-Chun Huang

Professor, Department of Psychology,
National Cheng Kung University, Taiwan

Talk: Beyond Individual Senses: Crossmodal Interactions in Human Perception and Artificial Intelligence

Abstract

Human perception is inherently multisensory, with interactions across sensory modalities shaping how we experience the world. This talk explores crossmodal interactions through two lines of research: correspondences between visual shapes and basic tastes, and the influence of auditory and visual motion on self-motion perception (vection). These studies illustrate how sensory interactions extend from associations between stimulus features to complex perceptual experiences. The talk also considers whether artificial intelligence can reproduce human-like crossmodal associations and what such similarities or differences might reveal about multisensory processing. Together, these perspectives highlight the importance of understanding how information across sensory modalities contributes to perception in both humans and artificial systems.

Biography

Pi-Chun Huang is a Professor in the Department of Psychology at National Cheng Kung University, Taiwan. She received her Ph.D. in Neuroscience from McGill University, Canada, in 2007. Her research focuses on visual perception, multisensory processing, and cognitive neuroscience. Her research interests include visual contextual effects, binocular vision, crossmodal correspondences, audiovisual interactions, and age-related changes in cognitive control. She employs psychophysical and behavioral methods, together with neuroscientific techniques such as event-related potentials (ERPs), and functional magnetic resonance imaging (fMRI), to investigate perceptual and cognitive processes.



Sean Shao-Min Hung

Assistant Professor, Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, Japan

Talk: Seeing Without Seeing: Implicit Peripheral Color Processing

Abstract

Human visual experience often appears as subjectively rich and coherent across the visual field. However, recent work using virtual reality demonstrated that observers frequently fail to notice peripheral color removal even when explicitly instructed to detect it (Cohen et al., 2020), suggesting that peripheral color phenomenology may be impoverished. Critically, this does not preclude the possibility that unseen peripheral color is still processed and influences behavior. Here, we examined whether colors in the "undetectable periphery" contribute to visual performance. In Experiment 1 (n = 30), participants navigated a panoramic VR scene in which peripheral colors were gradually desaturated. At random intervals, a fixation cross appeared, followed by a target dot presented in one of three regions: saturated/near, boundary, or desaturated/peripheral. Participants responded faster and localized targets more accurately in saturated/near regions. In Experiment 2 (n = 20), we controlled for eccentricity by including both saturated and desaturated conditions in the periphery. To ensure that color differences remained undetectable, each participant completed a pre-experiment calibration to estimate their individual chance-level color detection radius. The results replicated: even when participants could not phenomenally distinguish saturated from desaturated periphery, targets appearing in physically saturated regions yielded better performance. These findings show that peripheral colors—despite our limited capacity to reliably detect them—can facilitate visual detection and localization. More broadly, they reveal a dissociation between peripheral color phenomenology and the functional use of peripheral color information in guiding behavior.

Biography

Shao-Min (Sean) Hung is an experimental psychologist at Tohoku University. His research explores consciousness, attention, and aging, with a particular interest in how the brain processes information that never reaches conscious awareness. Using psychophysics, eye tracking, and neuroimaging, he investigates how unconscious information influences behavior and how attention shapes what enters conscious experience. His work also examines individual differences and age-related changes in these processes, with the broader goal of understanding the mechanisms and functions of unconscious processing. Before joining Tohoku University, he was an Assistant Professor at Waseda University and a James Boswell Postdoctoral Fellow at the California Institute of Technology. He received his Ph.D. in Cognitive Neuroscience from Duke-NUS Medical School.



Pei-Yin Chen

Researcher, Center for Information and Neural Networks,
National Institute of Information and Communications Technology,
Osaka, Japan

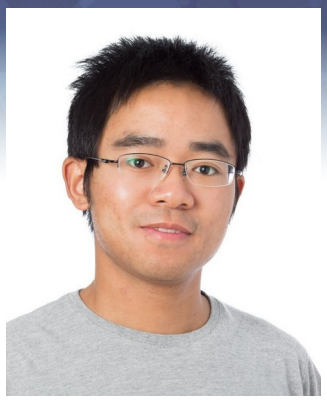
Talk: Cortical Representation under Wide-View Visual Experience

Abstract

Functional magnetic resonance imaging (fMRI) has been widely used to investigate how visual information is represented in human cortex. However, conventional fMRI visual presentation methods are typically limited to the central 20–30° of the visual field, leaving cortical representations associated with the far periphery largely unexplored. To provide a more natural visual experience in the MRI scanner, we adopted a customized wide-view binocular visual stimulation system (Wada et al., 2015, OHBM), which allowed visual presentation to cover 90–100° of the visual field in each eye. In this talk, I will introduce our recent work on retinotopic mapping under wide-view stimulation. Using population receptive field (pRF) modeling, we examined how retinotopic representations extend from central to far-peripheral visual fields and tested whether the largely reported linear pRF size-eccentricity relationship extends to the far periphery. In visual areas V1 to V3, hV4, and V3A/B, we found that the relationship between the pRF size and eccentricity from the fovea to the far periphery was better captured by a nonlinear regression function than by the linear functions commonly used in previous central vision studies. Further analysis of the relationship between the pRF estimates and cortical surface location revealed that in areas V1 to V3, the pRF eccentricity and size increased with increasing cortical distance up to certain values before either saturating or decreasing. Notably, these transitions occurred at different cortical distances, revealing distinct cortical-distance dependencies of pRF eccentricity and size that characterize their nonlinear relationship in the far periphery. Together, these findings demonstrate that wide-view visual stimulation reveals previously uncharacterized principles of cortical organization in the far periphery, extending our understanding of how visual information is represented beyond the limits of conventional central-vision fMRI studies.

Biography

Pei-Yin Chen is a Researcher at the Center for Information and Neural Networks (CiNet), National Institute of Information and Communications Technology (NICT), Osaka, Japan. She received her BS, MA, and PhD from the Department of Psychology at National Taiwan University in 2011, 2013, and 2019, respectively, where she developed expertise in visual psychophysics, computational modeling, and fMRI. She subsequently conducted postdoctoral research at the Department of Psychology, National Taiwan University, and the Department of Intelligence Science and Technology, Graduate School of Informatics, Kyoto University. Since joining CiNet, NICT, in 2023, her research has focused on investigating cortical representations of visual information using wide-view visual stimulation and fMRI.



Lin Gu

Research Institute of Electrical Communication,
Tohoku University, Japan

Talk: EvoGenesis: From Scientific Discovery to Physical AI

Abstract

"Artificial Cortex from Evolution" seeks to design a next-generation artificial cortical architecture inspired by natural evolution. By emulating the robustness and adaptability of biological neural systems, this work aims to develop AI systems with human-like cognitive capabilities, minimizing reliance on human annotation.

This research is built upon three key pillars: (1) Computational Photography, which enables the extraction and reconstruction of physical properties from visual data; (2) Human Gaze-Based Attention Mechanism, which aligns AI perception with human cognitive processes to enhance interpretability and efficiency; and (3) Multi-Modal Large Language Models (LLMs), which integrate diverse data modalities for advanced reasoning and understanding. By synthesizing these foundations, we propose an artificial cortex capable of learning from multimodal inputs, with broad applications in Medical AI, Nuclear Fusion, and Human-Friendly Robotics, demonstrating its transformative potential in addressing critical global challenges.

Biography

Dr. Lin Gu is an assistant professor at Tohoku University. Before, he was research scientist at RIKEN AIP, Japan and a special researcher at the University of Tokyo. He is with specific interest and expertise in the application of Artificial Intelligence in Medical Imaging and Computational Photography. Before moving to Japan, he was a postdoctoral research fellow at A*STAR, Singapore working on machine learning on biomedical imaging. He is now the project manager for Moonshot Program on Continuous Learning and Memory Mechanism and ACT-X Program on Gaze Assisted AI. His research interest lies in simulating human's neocortex to enhance AI, especially its application in medical fields.

Moderator



Yujie Peng

Associate Professor, Faculty of Humanities and Social Sciences,
Shizuoka University, Japan

Biography

Yujie Peng conducts research mainly in Anthropology. She received her PhD from Kyoto University in 2016, and currently works in Shizuoka University as Associate Professor. Her main research interests are: 1) Environmental perception, such as group walking, navigation, and knowledge. (related topic: atmospheres, communications, interactional analysis) 2) Body modifications, including decorations (tattooing, piercing etc.) and physical modifications (bodybuilding, combat sports, etc.).



Asaf Bachrach

Researcher, UMR 7023 CNRS,
Paris, France

Talk & Workshop 1: Understandoing: wondering as a collective engagement in/with the world a movement exploration

Abstract

Curiosity is mostly understood as either a psychological characteristic of individuals or a state of mind. It is generally defined as 'information seeking behavior or disposition'. Martin Heidegger (1984/1994) has criticized curiosity as an un-authentic disposition, contrasting it with wonder, which is not aimed at newness but instead at (the mere existence of) the most familiar, and where not-knowing or mystery is central. For Heidegger, wondering is Grundstimmung. Stimmung is translated both as mood and attunement. Attunements are not internal states of individuals but, like affect, properties of the situation or the right-now-unfolding-ness of the world. Understood as attunement, wondering is not just a feeling or a state we find ourselves in, but an ongoing (collective) activity.

In this workshop, we will practice collective wondering through embodied action. Here, moving serves as both the phenomenon we wonder about and the primary medium through which our shared inquiry unfolds.

(A collaboration with Annika Lübbert)

Reference: Heidegger, Martin. Basic Questions of Philosophy: Selected "Problems" of "Logic". Indiana University Press, 1994.

Biography

Asaf Bachrach holds a research position at the CNRS (UMR 7023, Paris). His academic training and topics of research include theoretical and experimental linguistics, cognitive neuroscience of language, dance spectating, group improvisation and collective creativity. Asaf has been practicing and teaching dance improvisation for over 25 years. He is also a certified Rolfer. His movement practice brings together improvisation, somatics, philosophy, linguistics and insights from cognitive science research. Over the last 15 years Asaf has led a number of interdisciplinary research projects on dance and improvisation (labodanse.org). Since 2020 Asaf lives, practices and gardens in a collective dance space in the south west of France (larret.org)



Chia-huei Tseng

Professor, Research Institute of Electrical Communication,
Tohoku University, Sendai, Japan

Talk: Copresence beyond Time and Space

Abstract

Copresence—the psychological state of feeling together with others—is strongly associated with optimal performance, user satisfaction, and heightened psychological well-being across diverse social contexts. However, the rapid evolution of information and communication technologies (ICT) has fundamentally decoupled social interaction from physical space and time, necessitating a critical reassessment of how copresence is conceptualized and evaluated.

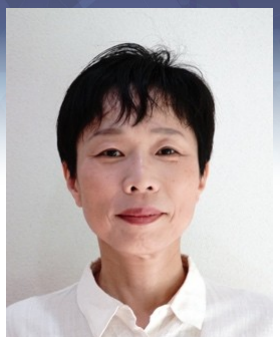
Key questions remain regarding whether virtual interactions replicate the perceptual dynamics of in-person togetherness and which mechanisms most effectively augment copresence during virtual and hybrid collaboration. This presentation introduces a new scientific project designed to investigate methods for enhancing spatial and temporal copresence. Ultimately, this session aims to foster domestic and international research collaborations to advance both theoretical frameworks and empirical methodologies in copresence research.

Biography

Chia-huei Tseng received B.S. and B.M. degrees from National Taiwan University, Taiwan, and Ph.D. degrees from University of California, Irvine, U.S.A. She was a faculty member at National Cheng-kung University, National Taiwan University, University of Hong Kong, and now a professor at Tohoku University.

She used psychophysical, neurophysiological, and computational modeling to examine cognitive functions such as learning, perception, and attention. Since her joining to Research Institute of Electrical Communication at Tohoku University in 2016, she worked with engineers in new areas such as interpersonal implicit communication, human-robot interaction, and cross-cultural understanding. She is also a member in the Interdisciplinary ICT Research Center for Cyber and Real Space since 2023.

Workshop



Chico Katsube



Shoko Kashima

Chico Katsube / Shoko Kashima

Dance artists, Contact Improvisation Group CIco

Workshop 2: By a Practical and Physical Approach

Abstract

In this practical exercise, participants will discover the phenomenon of spontaneously moving their bodies while simultaneously coexisting with others present. Furthermore, the aim is for individuals to experience the ability to freely move between time and space while simultaneously being present in the here and now.

Biography

Chico Katsube: Dance artist and founder of the Contact Improvisation Group CIco. Born in Osaka City, currently living in Isa City, Kagoshima Prefecture. Graduated from the Graduate School of Humanities, Ochanomizu University, majoring in dance education. Invited to the International CI Conference and Festival, her interpretations and proposals of oriental CI have been well received around the world. Moved to Kagoshima Prefecture in 2012. Organizes the international dance festival i-Dance Japan. While expanding international networks, also focuses on local artistic activities. In the age of COVID-19, launched “offline remote dance”, thanks to which people from all over the world can connect and dance even in the midst of the pandemic. In recent years, "Body Philosophy Dance Workshop" has been highly praised in Isa City and Kagoshima City.

Shoko Kashima: Dance artist, Contact Improvisation Group CIco. Originally from Chiba, Japan. Holds a master’s degree from the Graduate School of Humanities and Sciences at Ochanomizu University. In 2002, studied in New York as part of an overseas training program sponsored by the Agency for Cultural Affairs. In 2005, joined the contact improvisation group "CIco." Has taught contact improvisation (CI) and performed internationally—including in Israel, Ibiza, various locations across Europe, North America, the Nordic region, Africa, and Asia—as well as within Japan. Appeared in the ending sequence of the 2012 NHK drama Hatsukoi (First Love). Relocated to a mountainous area at the northern tip of Kagoshima Prefecture in 2012; since 2013, has organized the "i-Dance Japan" International Contact Improvisation Festival. Currently leads "Body Philosophy Dance" workshops in Kagoshima, while enjoying an agrarian lifestyle.

END