THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

DIVISION OF SOCIAL SCIENCE 社會科學部

CAIRE Center for Artificial Intelligence Research

COGSCI 2024 HONG KONG MEETUP

Cognitive Science in the Era of AI

Time: August 26, 2024

Venue: Jockey Club Institute for Advanced Study Lecture Theatre (IAS LT), Floor G, Hong Kong University of Science and Technology

Schedule

Registration & Opening	
8:30am-9:00am	Registration
9:00am-9:15am	Opening remarks by **Prof. Janet Hsiao** and Group Pictures
Session 1: Moderator – Prof. Qifeng Chen (CSE, HKUST)	
9:15am-10:05am	Keynote speech by **Prof. Byoung-tak Zhang** *Talk Title: Humanoid AI: Reverse Engineering the Embodied Mind*
10:05am-10:30am	Presentation by **Prof. Antoni Chan** *Talk Title: Towards the next generation explainable AI that promotes AI-human mutual understanding*
10:30am-11:00am	Coffee break
Session 2: Moderator – Prof. Chen Cheng (Social Science, HKUST)	
11:00am-11:25am	Presentation by **Prof. Mutsumi Imai** *Talk Title: The contingency symmetry bias as a foundation for word learning*
11:25am-11:50am	Presentation by **Prof. Guang Ouyang** *Talk Title: Working memory – Conceptualization, Measurement, and Neural Correlates*
11:50am-12:15pm	Presentation by **Prof. Hyeong-dong Park** *Talk Title: Breathing is coupled with voluntary initiation of motor and mental actions*
12:15pm-1:00pm	Lunch break

1:00pm-2:00pm	Poster presentation session
Session 3: Moderator – Prof. Julie Semmelhack (Life Science)	
2:00pm-2:50pm	Keynote speech by **Prof. Kenji Doya** *Talk Title: Bayesian inference, reinforcement learning, and the cortico-basal ganglia circuits*
2:50pm-3:15pm	Presentation by **Prof. Byoung-kyong Min** *Talk Title: Thalamocortical neurodynamics in human conscious perception*
3:15pm-3:40pm	Presentation by **Prof. Yiwen Wang** *Talk Title: Autonomous task learning for motor Brain machine interfaces*
3:40pm-4:10pm	Coffee break
Session 4: Moderator – Prof. Quentin Qin (Humanities)	
4:10pm-4:35pm	Presentation by **Prof. Yohei Oseki** *Talk Title: Building machines that process and learn natural language like humans*
4:35pm-5:00pm	Presentation by **Prof. Zhenguang Cai** *Talk Title: Exploring Neural Representations for Humanlike Language Comprehension and Production in GPT-2*
5:00pm-5:50pm	Keynote Speech by **Prof. Yike Guo** *Title Talk: Read Your Mind with AI*
5:50pm-6:00pm	Closing Remarks

Prof. Byoung-tak Zhang

Professor
Department of Computer Science and Engineering,
Director of the AI Institute, Seoul National University
Talk title: Humanoid AI: Reverse Engineering the Embodied Mind

➢ Biography

Byoung-Tak Zhang is POSCO Chair Professor of Computer Science, Cognitive Science, and Brain Science at Seoul National University, Seoul, Korea and Director of the AI Institute at Seoul National University (AIIS). He served as the President of the Korean Artificial Intelligence Society (2010-2013) and the Korean Society for Cognitive Science (2017). He has been investigating brain-inspired cognitive learning architectures and algorithms for artificial intelligence and cognitive science with a focus on achieving human-level AI and building human-like robots that learn autonomously in a real world. He received his Ph.D. in computer science from University of Bonn in 1992, B.S. and M.S. in computer science and engineering from Seoul National University. Prior to joining the Seoul National University in 1997, he worked as Research Fellow at the German National Research Center for Computer Science (GMD, now Fraunhofer Institutes) in Sankt Augustin/Bonn for 1992-1995. He has been Visiting Professor at the MIT Computer Science and Artificial Intelligence Lab (CSAIL) and Brain and Cognitive Science Department (2003-2004), the Samsung Advanced Institute of Technology (SAIT) (2007-2008), the BMBF Excellence Centers for Cognitive Technical Systems (CoTeSys, Munich) and Cognitive Interaction Technology (CITEC, Bielefeld) (Winter of 2010-2011), and the Princeton Neuroscience Institute (PNI) (2013-2014). His work has been recognized by a number of awards and honors, including the Korea Red Stripes Order of Service Merit, INAK Award, Minister of Science and Technology Award, and Okawa Research Award.

Prof. Antoni Chan

Professor & Associate Head
Department of Computer Science, City University of Hong Kong
Talk title: Towards the next generation explainable AI that promotes AI-human mutual understanding

➢ Biography

Prof. Antoni B. Chan received the B.S. and M.Eng. degrees in electrical engineering from Cornell University, Ithaca, NY, USA, in 2000 and 2001, respectively, and the Ph.D. degree in electrical and computer engineering from University of California at San Diego (UCSD), La Jolla, CA, USA, in 2008. He was a Visiting Scientist with the Vision and Image Analysis Laboratory, Cornell University, from 2001 to 2003, and a Post-Doctoral Researcher with the Statistical Visual Computing Laboratory, UCSD, in 2009. In 2009 he joined the Department of Computer Science, City University of Hong Kong, Hong Kong, where he is currently a Professor. His research interests include computer vision, machine learning, explainable AI (XAI), eye-gaze analysis, and music analysis. Prof. Chan received the National Science Foundation Integrative Graduate Education and Research Training Fellowship from 2006 to 2008, and an Early Career Award from the Research Grants Council of the Hong Kong Special Administrative Region, China, in 2012. He is currently an associate editor for IEEE Transactions on Pattern Analysis and Machine Intelligence, and serves as area chair for computer vision and machine learning conferences, including CVPR, ICCV, ECCV, NeurIPS, ICML, and ICLR.

Prof. Mutsumi Imai

Professor
Faculty of Environmental Information, Keio University

Talk title: The contingency symmetry bias as a foundation for word learning

➢ Biography

Mutsumi Imai is a developmental psychologist studying lexical and conceptual development. She received her Ph.D degree from Northwestern University. MI's greatest interest is to specify the processes and mechanisms through which children build up the system of lexical as well as non-lexical knowledge. Her unique contribution to the field is her cross-linguistic perspective in the investigation of lexical acquisition. She has examined how universal and specific language factors affect lexical development, and she has also investigated the effect in the other direction, that is, how language and culture affect thought. She has established that the relation between cognitive development and language learning consists of a bi-directional bootstrapping process (Imai, Kanero, & Masuda, 2015, 2020; Imai & Masuda, 2013).

MI has also asked what cognitive function or knowledge enables children to anchor words to the world to start the bootstrapping process. In this vein, she has investigated how iconicity between word form and meaning plays a scaffolding role for children to anchor word forms onto object concepts first, and then to abstract relational concepts of verbs later (Imai & Kita, Nagumo & Okada, 2008). MI has proposed a sound symbolism bootstrapping hypothesis for language acquisition (Imai & Kita, 2014). This proposal has inspired hundreds of new research projects across a range of disciplines, including (but not limited to) language development, language evolution, embodied cognition and multi-modal cognition.

MI has delivered talks to schoolteachers and administrators in many prefectures and cities in Japan. With the Board of Education in Hiroshima prefecture in Japan, MI has developed tests for identifying tests of language, math, and thinking skills that underlie academic learning in primary and secondary schools, and theses tests have been widely used in schools in Japan.

MI has been designated a Fellow of the Cognitive Science Society as well as is a Governing Board member of that Society since 2017. She is also a Fellow member of the Psychonomic Society and has served as Executive Board member of the International Association for the Study of Child Language (IASCL).

Prof. Guang Ouyang

Associate Professor
Academic Unit of Human Communication, Learning, and Development , The University of Hong Kong

Talk title: Working memory – Conceptualization, Measurement, and Neural Correlates

➢ Biography

Dr. Ouyang received a bachelor's degree from Nanjing University (Physics) and a PhD from Hong Kong Baptist University (Physics and Cognitive Neuroscience). He is currently an associate professor at the University of Hong Kong. His research focuses on developing signal processing methods to exploit information from complex neural signals related to cognition and learning. He has worked in neural signal analysis for more than ten years and gained expertise in the detailed features and composition of neural signals recorded at multiple levels. Dr. Ouyang also has rich experience in applying deep-learning networks in neural decoding. He has developed an advanced electroencephalography (EEG) signal processing method that has supported 100+ publications by labs from 13 countries. Dr. Ouyang's EEG-based research has been published in more than 35 peer-reviewed journal papers in cognitive neuroscience.

Prof. Hyeong-dong Park

Assistant Professor
Department of Brain and Cognitive Sciences, Korea Advanced Institute of Science & Technology (KAIST)

Talk title: Breathing is coupled with voluntary initiation of motor and mental actions

➢ Biography

I am an assistant professor in the Department of Brain and Cognitive Sciences at KAIST. I received my Ph.D from The Doctoral School of Brain-Cognition-Behaviour at Pierre and Marie Curie University (UPMC), France in 2014. Then I moved to the Swiss Federal Institute of Technology in Lausanne (EPFL) in Switzerland and worked as a post-doc until 2020. Then, I worked as an associate professor at Taipei Medical University in Taiwan until July 2023.

Prof. Kenji Doya

Professor
Neural Computation Unit, Okinawa Institute of Science & Technology
Talk title: Bayesian inference, reinforcement learning, and the cortico-basal ganglia circuits

➢ Biography

Kenji Doya is a Professor of Neural Computation Unit, Okinawa Institute of Science and Technology (OIST) Graduate University. He studies reinforcement learning and probabilistic inference, and how they are realized in the brain. He took his PhD in 1991 at the University of Tokyo, worked as a postdoc at U. C. San Diego and the Salk Institute, and joined Advanced Telecommunications Research International (ATR) in 1994. In 2004, he was appointed as a Principal Investigator of the OIST Initial Research Project and as OIST established itself as a Graduate University in 2011, he became a Professor and served as the Vice Provost for Research till 2014. He served as a Co-Editor in Chief of Neural Networks from 2008 to 2021 and the Chairperson of Neuro2022 in Okinawa, and currently serves as the President of Japanese Neural Network Society (JNNS). He received INNS Donald O. Hebb Award in 2018, JNNS Academic Award and APNNS Outstanding Achievement Award in 2019, and the age-group 2nd place at Ironman Malaysia in 2022.

Prof. Byoung-kyong Min

Professor
Department of Brain and Cognitive Engineering, Korea University
Director, Institute of Brain & Cognitive Engineering
President, Korean Society for Cognitive Science
Talk title: Thalamocortical neurodynamics in human conscious perception

➢ Biography

Dr. Byoung-Kyong Min received an M.S. degree in Neurobiology and Physiology from Northwestern University, Evanston, IL, USA, in 1998, and a Ph.D. degree in Natural Science (EEG study) from the Department of Biological Psychology, Magdeburg University, Germany, in 2007. He currently works as a full professor in the Department of Brain and Cognitive Engineering, Korea University. He is the director of the Institute of Brain and Cognitive Engineering, Korea University, and the president of the Korean Society for Cognitive Science. His research interests include human conscious perception and intentional mental processes using neuroimaging signals such as EEG, MEG, and fMRI. He is working to identify their neural signature, which can be consequently employed as potent brain signals to cognitively control brain-machine interfaces. He has also investigated how to modulate neural activities in a non-invasive manner, leading to the augmentation of cognitive performance. He has combined transcranial current stimulation (or ultrasound sonication) with EEG-based brain-machine interfacing technology to accomplish a non-invasive human brain-to-brain interface.

Prof. Yiwen Wang

Associate Professor
Department of Electronic & Computer Engineering &
Department of Chemical and Biological Engineering,
Hong Kong University of Science and Technology

Talk title: Autonomous task learning for motor Brain machine interfaces

➢ Biography

Yiwen Wang received B.S. and M.S. degrees from University of Science and Technology of China (USTC), Hefei, Anhui, China respectively. She received a Ph.D. degree from University of Florida, Gainesville, FL, USA. She joined as an associate professor at Zhejiang University, Hangzhou, China. She is now an associate professor with substantiation at the Department of Electronic and Computer Engineering, Department of Chemical and Biological Engineering, the Hong Kong University of Science and Technology. Her research interests are in neural decoding of brain-machine interfaces, adaptive signal processing, computational neuroscience, and neuromorphic engineering. She served as the Chair of the IEEE EMBS Neural Engineering Tech Committee, the chair of the IEEE BRAIN publication subcommittee, and the board member of Brain Computer Interfaces Society. She was the Editor-in-Chief of the IEEE Brain Newsletter. She also serves on the editorial board of the Journal of Neural Engineering, is an associate editor of the IEEE Transactions on Neural Systems and Rehabilitation Engineering, and was the associate editor of Frontiers in Human Neuroscience (Brain-Computer Interfaces) and associate editor of the IEEE Transactions on Cognitive and Developmental Engineering. She was recognized as IEEE EMBS distinguished lecturer in 2022 and received IEEE EMBS Distinguished Service award in 2023. She holds two US patents and has authored more than 100 peer-reviewed publications.

Prof. Yohei Oseki

Associate Professor, Graduate School of Arts and Sciences, Language and Information Sciences
University of Tokyo

Talk title: Building machines that process and learn natural language like humans

➢ Biography

Yohei Oseki is an Associate Professor in the Department of Language and Information Sciences at the University of Tokyo and a visiting scientist at RIKEN Center for Advanced Intelligence Project (AIP). Before joining the University of Tokyo, he received a Ph.D. from New York University in 2018 and visited the University of Massachusetts Amherst in 2012-2013 and the Cold Spring Harbor Laboratory in 2014. His research integrates natural language processing with cognitive and brain sciences and attempts to build machines that process and learn natural language like humans. He co-organizes Cognitive Modeling and Computational Linguistics (CMCL) and also serves as an Area Chair at International Conference on Computational Linguistics (COLING) and Asia-Pacific Chapter of the Association for Computational Linguistics (AACL). He won Best Paper Awards at CMCL 2019 and LREC-COLING 2024.

Prof. Zhenguang Cai

Professor
Department of Linguistics and Modern Languages, Chinese University of Hong Kong

Talk title: Exploring Neural Representations for Humanlike Language Comprehension and Production in GPT-2

➢ Biography

Zhenguang Cai is a Professor at the Department of Linguistics and Modern Languages, The Chinese University of Hong Kong. He received his PhD in psychology from University of Edinburgh. He was a lecturer at University of East Anglia and an ESRC Future Research Leader fellow at University College London. He uses behavioural, neuroscientific and computational methods to reveal representations and processes underlying language comprehension, language production, and language learning. More recently, he investigates the extent to which large language models resemble humans in language use. For more info, please visit: www.cuhklpl.github.io.

Prof. Yike Guo

Provost
Chair Professor, Department of Computer Science and Engineering & Department of Electronic and Computer Engineering
Hong Kong University of Science and Technology

Talk title: Read Your Mind with AI

➢ Biography

Prof. Yike Guo is the Provost of the Hong Kong University of Science and Technology and Chair Professor in the Department of Computer Science and Engineering. He is a world-renowned computer scientist who has led several large-scale AI and data science research projects in Hong Kong, UK and other European countries. He was the Vice-President (Research and Development) of Hong Kong Baptist University and the founding Director of the Institute of Data Science at Imperial College London's six global institutes. He is also a Fellow of the Royal Academy of Engineering (FREng), a Fellow of the European Academy of Sciences (MAE), a Fellow of the Hong Kong Academy of Engineering Sciences (FHKEng), a Fellow of the Institute of Electrical and Electronics Engineers (FIEEE), a Fellow of the British Computer Society (FBCS), and a Fellow of the Chinese Institute for Engineering Intelligence (FCAAI).

Poster Presentations

Poster Number	Title	Presenter	Affiliation
1	Presence of description moderates memory biases in decision-making	Zepeng Sun	University of Warwick
2	Exploring the Impact of Billboard Position, Format, and Visual Attractiveness on Advertising Effectiveness in Driving Scenarios	Xianyun Liu	Tianjin Normal University
3	Holes are visual proto-objects with incomplete properties: Subitizing holes and hole-specific preview benefit	Fuju Liu	Beijing Normal University
4	Semantic Content in Face Representation: Essential for Proficient Recognition of Unfamiliar Faces by Good Recognizers	Tong Jiang	Sun Yat-Sen University
5	Real-World Visual Search in Autistic Individuals	Alice Yumeng Yang	The University of Hong Kong
6	The impact of mask use on face recognition in adults with autism spectrum disorder: An eye-tracking study	Yueyuan Zheng	The University of Hong Kong
7	Is Holistic Processing Associated with Face Scanning Pattern and Performance in Face Recognition? Evidence from Deep Neural Network with Hidden Markov Modeling	Yueyuan Zheng	The University of Hong Kong
8	Neural tuning not correlated activity determines attention effects in the human brain	Yu-Qi You	Shanghai Jiao Tong University
9	Possible mechanisms of Alzheimer's disease	Lily Yang, Xue-Meng Li	Shaoguan Microelement Research Institute, University of Macau
10	Sequential Temporal Anticipation Characterized by Neural Power Modulation and in Recurrent Neural Networks	Xiangbin Teng	The Chinese University of Hong Kong
11	Generic Neural Computational Construct for Instantaneous Estimation: A Pilot Study	Yingzhe Li	The University of Hong Kong
12	Testosterone administration increases sensitivity to social evaluation during dynamic updating of state self-esteem in healthy males: A computational modeling approach	Jixin Long	The Hong Kong Polytechnic University
13	Harnessing Nicotine's Neural Mechanisms for Advanced AI Development	Shutong Liu	Duke Kunshan University
14	Comparative Analysis of Work Stress Among Pharmacists in Traditional Chinese Medicine and Western Medicine Pharmacies Using AI-Assisted HRV Monitoring	Zexi Chen	University of California, Irvine
15	Human experience matters in cognitive science research	Chenyu Huang	The Hong Kong University of Science

			and Technology (Guangzhou)
16	Challenges Toward Cognitive Architecture Integrating Emotion, Intelligence and Society	Junya Morita	Shizuoka Universoty
17	Demystify Deep-learning AI for Object Detection using Human Attention Data	Jinhan Zhang	The University of Hong Kong
18	Do Saliency-Based Explainable AI Methods Help Us Understand AI's Decisions? The Case of Object Detection AI	Ruoxi Qi	The University of Hong Kong
19	Two heads are better than one: the use of social cognitive offloading in working memory in six-year-olds and adults	Chen Cheng	The Hong Kong University of Science and Technology
20	CogSimulator: A Model for Simulating User Cognition & Behavior with Minimal Data for Tailored Cognitive Enhancement	Weizhen Bian	The Hong Kong University of Science and Technology
21	Enhancing Inhibitory Control in Internet Gaming Disordered Adolescents with AI Generated Content	Zhang Meiqi	Universiti Putra Malaysia
22	Properties of AI-generated images that influence misinformation belief and correction efficacy	Sean Guo	The University of Hong Kong
23	The priming effect of accuracy and morality–value-based model in news sharing	Xiaozhe Peng	Shenzhen university
24	Eye Movement Behavior during Mind Wandering across Different Tasks in Interactive Online Learning	Xiaoru Teng	The University of Hong Kong
25	Investigating the Impact of Academic Rhetoric on Introduction Understanding through Eye Tracking Analysis	Ziren Tang	The Hong Kong University of Science and Technology (GZ)
26	Influence of Vocal Cues on Perception of Traits: Evidence from Educational Context	Mingyu Weng	Purdue University
27	Curiosity enhances semantic structure and verbal analogical reasoning	Adel Chaouch-Orozco	The Hong Kong Polytechnic University
28	Acquiring variation in classifier learning: Evidence from child and adult Chinese speakers	Jiahuan Zhang	The University of Hong Kong
29	Prior knowledge benefits older adults' tonal consolidation through talker generalization	Kangdi Liu	The Hong Kong University of Science and Technology
30	Distributional learning of non-native tone contrasts by older adults after training and overnight consolidation	Yin-To Chui	The Hong Kong University of Science and Technology
31	An Investigation of Phonological Skills in Chinese Developmental Dyslexia Using a Machine Learning Approach	Ning Ding	Shaanxi Normal University
32	Understanding the multifaceted aspects of language and cognitive impairments using data from Cantonese AphasiaBank and Chinese TBI Bank	Anthony Pak-Hin Kong	The University of Hong Kong

33	Automated Detection of Atypical Language Development Using Machine Learning: A Focus on the Procedural Circuit Deficit Hypothesis	Jueyao Lin	The Hong Kong Polytechnic University
34	Effect of antiphonal singing experience on the speech abilities of Zhuang People：a fNIRS study	Yuhan Li	Guangxi Normal University
35	Effect of Mandarin Speakers' Musical Aptitude on the Perception of English Vowels: An Eye-tracking Study	Jiayu Liang	The Hong Kong University of Science and Technology
36	Does tone type and multilingualism influence attentional control in the forced-attention dichotic listening task of Cantonese tone?	Yuqi Wang	The Hong Kong University of Science and Technology
37	Large language model tokens bear meaning	David A. Haslett	The Hong Kong University of Science and Technology
38	Do large language models resolve semantic ambiguities in the same way as humans? The case of word segmentation in Chinese sentence reading	Weiyan Liao	The University of Hong Kong
39	A Study on the Cognitive Communication Mechanism of English Translation of Five Elements Metaphors in Traditional Chinese Medicine from the Perspective of Experimental Philosophy	Yayuan Qu	Xi'an Polytechnic University
40	Location, Partiality and Scale-poles: in the Case of Japanese Abstract Noun 'Tokoro'	Ruchira Palihawadana	Kyoto University