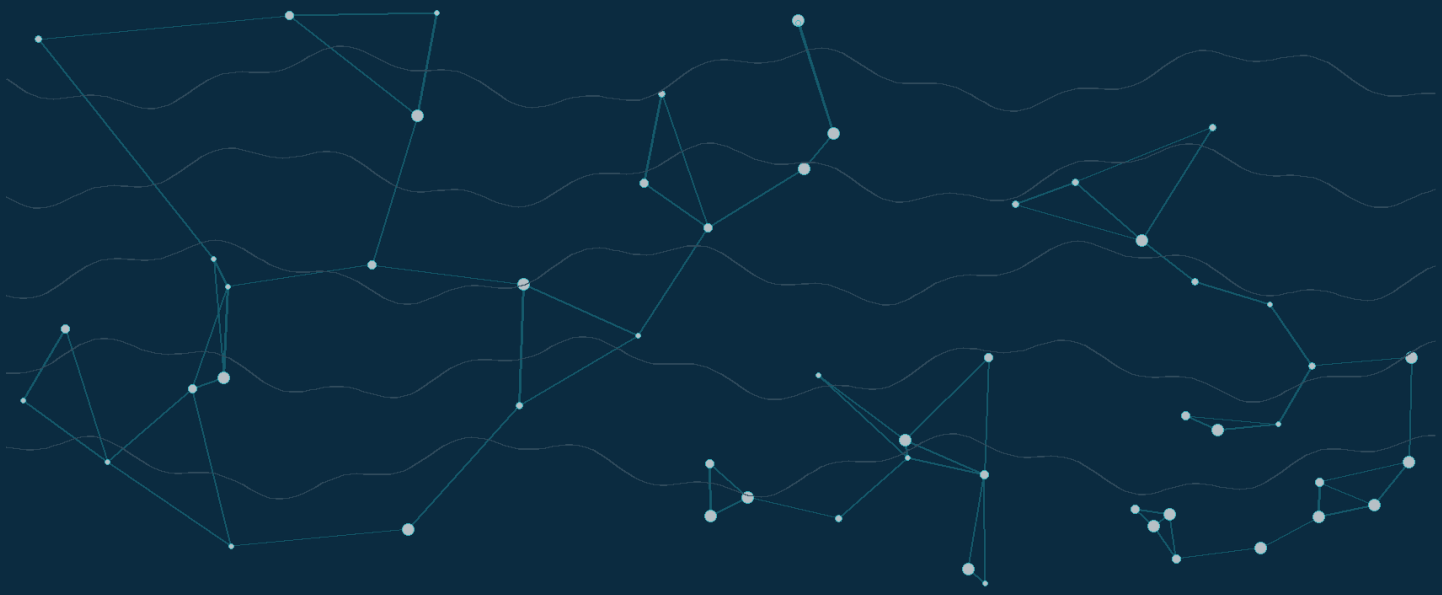

GLOBAL BRAIN CONSORTIUM

2026 GENERAL ASSEMBLY

FINAL SCIENTIFIC PROGRAM
& ABSTRACT BOOK

4-5 September 2026

Crowne Plaza Hotel | Chengdu, China

Connecting global neuroscience through equitable collaboration, open science, multimodal brain research and responsible innovation

GLOBAL BRAIN CONSORTIUM 2026

Meeting Overview

DATES	CITY	VENUE	GBC ROOM
4-5 September 2026	Chengdu, China	Crowne Plaza Hotel	Spruce Room

The 2026 Global Brain Consortium General Assembly convenes an international community of neuroscientists, clinicians, engineers and data scientists to advance equitable collaboration, open science, multimodal brain research and responsible innovation. The GBC program is presented as a focused track within the Belt and Road Brain Science Forum and is organized around a named lecture, keynote presentations, emerging-investigator flash talks and protected thematic discussion.

All times are China Standard Time (UTC+8). Hotel-wide plenary activities, coffee breaks, lunch and closing events are fixed. Program information is correct at the time of publication.

SCIENTIFIC FORMAT

The Vera Gross Lecture is allocated 50 minutes, followed by a dedicated 10-minute Q&A. Each keynote speaker has a nominal 30-minute allocation, implemented as a 25-minute presentation with discussion pooled at the end of the thematic block (except some due to time constraints, some keynotes have only 15 mins). Emerging Investigator Flash Presentations are five minutes. Chairs will protect all discussion periods and maintain the published timetable.

Program Themes

Developmental population neuroscience Longitudinal cohorts, brain growth charts, environmental pathways and lifespan neurophysiology.	**Multiscale organization and dynamics** Brain networks, transcriptomics, aperiodic activity, latent states and stochastic dynamics.
AI and precision neurophysiology Computational mental health, automated EEG interpretation and normative modelling.	**Clinical and translational neuroscience** Affective disorders, addiction, face recognition, headache, schizophrenia and neural-circuit control.

GLOBAL BRAIN CONSORTIUM

Leadership and Committees

Alan Evans
Director of the GBC

Pedro Antonio Valdés-Sosa
Director of the GBC

STEERING COMMITTEE

Paolo Rossini
Katrin Amunts
Paul Thompson
Dezhong Yao
Maryann Martone
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Ludovico Minati
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Shiang Hu (Andy)
Qing Wang (Vincent)

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Yin Qiyang (Elina)
Zeng Saiyang (Soraya)
Feng Liang-chou (Anthony)
Shenxin Hu

PROGRAM LEADERSHIP

Alan Evans - Program Co-Chair
Pedro Antonio Valdés-Sosa - Program Co-Chair
Maria Luisa Bringas Vega - Session Chair

PROGRAM DESIGN

The GBC General Assembly is embedded within the hotel-wide Belt and Road Brain Science Forum. All GBC scientific sessions take place in the Spruce Room. Hotel-wide registration, plenary activities, coffee breaks, lunch and closing events are shown in the program overview and remain fixed.

PROGRAM AT A GLANCE

Friday, 4 September 2026

07:30-08:30 **Hotel-wide registration** Crowne Plaza Lobby	**08:30-12:30** **Opening ceremony and plenary keynotes** Diamond Ballroom	**12:30-14:00** **Hotel-wide lunch** Crowne Plaza Hotel

Opening, Developmental Population Neuroscience and the Vera Gross Lecture

Friday, 4 September 2026 | Spruce Room | Session Chair – Maria Bringas Vega

TIME	FORMAT	SPEAKER	PRESENTATION
14:00-14:20	Opening	Alan Evans and Pedro Antonio Valdés-Sosa	*Welcome and introduction to the Global Brain Consortium 2026 General Assembly*
14:20-15:10	Vera Gross Lecture	Xi-Nian Zuo	Developmental Population Neuroscience: A Landscape Takes Shape
15:10-15:25	Keynote	Chanlin Yi	Neural Mechanisms of Collective Intelligence: An Inter-Brain Spatiotemporal Network Perspective
15:25-15:30	Emerging Investigator Flash	Wu Kangjia (Kevin)	Lifespan Xi/Alpha Cortical Dynamics: Linking Age-Related Brain Maps to Gene Expression and Neurochemical Architecture
15:30-15:50	Discussion		*Vera Gross Lecture Q&A/ Moderated thematic discussion*

15:50-16:40 | Hotel-wide coffee break and poster viewing

Brain Dynamics, Multiscale Organization and Quantitative Neurophysiology

Friday, 4 September 2026 | Spruce Room | Session Chair – Maria Bringas Vega

TIME	FORMAT	SPEAKER	PRESENTATION
16:40-17:05	Keynote	Wael El-Deredy	Imaging brain dynamics: between biophysics, machine learning and big data
17:05-17:30	Keynote	Xu Lei	Function, Computation, and Application of Aperiodic Components in EEG
17:30-17:55	Keynote	Ronaldo García Reyes	Spatial transcriptomic programs relate to Spectro laminar rhythms across macaque cortex
17:55-18:00	Emerging Investigator Flash	Loidel Barrera Rodríguez	Latent Space and Potentials from EEG
18:00-18:05	Emerging Investigator Flash	Liuchang Feng (Anthony)	From High-Dimensional Neural Signals to Interpretable Stochastic Dynamics
18:05-18:20	Discussion		*Integrated discussion*

EVENING PROGRAM

Hotel-wide dinner begins at 18:30.

PROGRAM AT A GLANCE

Saturday, 5 September 2026 - Morning

Multiscale Brain Organization, Affective Neuroscience and Clinical Phenotypes

Saturday, 5 September 2026 | Spruce Room | Session Chair – Pedro Antonio Valdes Sosa

TIME	FORMAT	SPEAKER	PRESENTATION
08:30-08:55	Keynote	Alexander Savostyanov	The EEG/fMRI reactions under emotional speech recognition as the markers of personality traits and affective disorders
08:55-09:20	Keynote	Bratislav Mišić	Integrating Anatomical, Metabolic, Genetic and Functional Information Across the Brain
09:20-09:45	Keynote	Benjamin Klugah-Brown	Beyond Behavioral Labels: A 20 Years of Transdiagnostic Neuroimaging Signature of Behavioral Addiction
09:45-09:55	Keynote	Anisleidy González-Mitjans	Modelling epileptic transitions through anatomically grounded distributed delays
09:55-10:00	Emerging Investigator Flash	Jiadong Yan	Individual-Level Associations of Cognition and Personality With Adolescent Mental Health Vary Across Brain and Environmental Profiles
10:00-10:10	Discussion		*Integrated discussion*

10:10-10:30 | Hotel-wide coffee break

AI, Precision EEG and Computational Brain Health

Saturday, 5 September 2026 | Spruce Room | Session Chair – Ludovico Minati

TIME	FORMAT	SPEAKER	PRESENTATION
10:30-10:55	Keynote	Benjamin Becker	Opportunities for computational and AI strategies in neuroscience and mental health
10:55-11:20	Keynote	Carlos López-Naranjo	On applying artificial intelligence to the SCORE classification of EEG events.
11:20-11:45	Keynote	Shiang Hu	Quantitative Methodological Advances in EEG Normative Modeling toward Precision Brain Health
11:45-11:50	Emerging Investigator Flash	Sofia Albizu-Campos	Koopman Operator for nonlinear models of EEG
11:50-11:55	Emerging Investigator Flash	Yu Jin	Source-space precision charts for lifespan EEG connectomics
11:55-12:10	Discussion		*Integrated discussion*

HOTEL-WIDE LUNCH

12:10-14:00 at the Crowne Plaza Hotel. The GBC scientific program resumes in the Spruce Room at 14:00.

PROGRAM AT A GLANCE

Saturday, 5 September 2026 - Afternoon

LUNCH	GBC SCIENCE	COFFEE	HOST PLENARY
12:10-14:00	14:00-15:40	15:40-16:00	16:00-17:30

Clinical, Translational and Systems Neuroscience

Saturday, 5 September 2026 | Spruce Room | Session Chair – Pedro Antonio Valdes Sosa

TIME	FORMAT	SPEAKER	PRESENTATION
14:00-14:25	Keynote	**María Antonieta Bobes León**	What Face-Recognition Disorders Reveal About the Human Face-Recognition System
14:25-14:50	Keynote	**Stefania Ferraro**	Headaches: What have we learned from neuroimaging?
14:50-15:15	Keynote	**Wang Qing (Vincent)**	Asymmetric Dual-Trajectory of Clinical and Neural Recovery for meditation in Schizophrenia
15:15-15:20	Emerging Investigator Flash	**Hayat Boussaid**	Simulation of Controlled Neural Circuits with Delayed Network Coupling
15:20-15:35	Discussion		*Integrated discussion*
15:35-15:40	Closing		*GBC scientific wrap-up and transition to the hotel-wide plenary program*

CLOSING PROGRAM

Following the GBC scientific wrap-up, coffee is served from 15:40 to 16:00. The final keynotes take place from 16:00 to 17:30 in the Diamond Ballroom, followed by the closing ceremony at 17:30.

SCIENTIFIC FACULTY

Speakers, Biographies and Abstracts

Speaker-submitted biographies and abstracts from the original program and subsequently submitted forms are reproduced without abridgement. Where a formal abstract was not supplied, a concise Presentation Overview is provided from the confirmed title and publicly available institutional information.

Xi-Nian Zuo · Vera Gross Lecturer	**Stefania Ferraro** · Keynote Speaker
Wael El-Deredy · Keynote Speaker	**Wang Qing (Vincent)** · Keynote Speaker
Ronaldo García Reyes · Keynote Speaker	**Chanlin Yi** · Keynote Speaker
Xu Lei · Keynote Speaker	**Anisleidy González-Mitjans** · Keynote Speaker
Alexander Savostyanov · Keynote Speaker	**Loidel Barrera Rodríguez** · Emerging Investigator Flash Speaker
Bratislav Mišić · Keynote Speaker	**Liuchang Feng (Anthony)** Emerging Investigator Flash Speaker
Benjamin Klugah-Brown · Keynote Speaker	**Jiadong Yan** · Emerging Investigator Flash Speaker
Benjamin Becker · Keynote Speaker	**Wu Kangjia (Kevin)** Emerging Investigator Flash Speaker
Carlos López-Naranjo · Keynote Speaker	**Sofia Albizu-Campos** · Emerging Investigator Flash Speaker
Shiang Hu · Keynote Speaker	**Yu Jin (Kin)** Emerging Investigator Flash Speaker
María Antonieta Bobes León · Keynote Speaker	**Hayat Boussaid** · Emerging Investigator Flash Speaker

VERA GROSS LECTURER

Xi-Nian Zuo

Beijing Normal University; Institute of Psychology, Chinese Academy of Sciences, China

Developmental Population Neuroscience: A Landscape Takes Shape

SHORT BIOGRAPHY

Professor Xi Nian is Professor of Cognitive Neuroscience at Beijing Normal University and Research Professor at the Institute of Psychology, Chinese Academy of Sciences. He serves as Director of the Developmental Population Neuroscience Research Center and the MRI Research Center. A Fellow of the Organization for Human Brain Mapping (OHBM), his research focuses on resting-state functional connectivity, lifespan brain development, neuroimaging methodology, and the reproducibility of neuroimaging findings.

PRESENTATION OVERVIEW

Developmental population neuroscience integrates longitudinal cohort design, reproducible neuroimaging and population-level brain charts to characterize individual trajectories from childhood through adolescence. The lecture will draw on large-scale developmental cohorts and open-science initiatives to consider how reliable measurement, normative modelling and culturally diverse datasets can move the field from group averages toward individualized assessment of brain development. It will also examine methodological variability and the implications of developmental brain maps for education, mental health and global neuroscience collaboration.

KEYNOTE SPEAKER

Wael El-Deredy

University of Valparaíso, Chile

Imaging brain dynamics: between biophysics, machine learning and big data

SHORT BIOGRAPHY

Wael El-Deredy is Distinguished Investigator of the Valencia Community, Spain, Professor of Biomedical Engineering at the University of Valparaíso, Chile, and Director of the Brain Dynamics Lab, an interdisciplinary group studying brain organisation through computational modelling, neuroimaging and data science. He is an associate researcher at Advance Centre for Electrical and Electronic Engineering, AC3E, and the Interdisciplinary Centre for Neuroscience of Valparaíso, CINV, Chile.

His research examines how brain activity evolves over time and how transient functional states emerge from the interaction between neural structure, physiology, behaviour and context. His work combines biophysical models of brain networks with signal processing, dynamical systems, machine learning and statistical methods, including state-space models and hidden semi-Markov models. A central theme is the relationship between brain connectivity, resonance and the modulation of neural dynamics through sensory and electrical stimulation. He has published more than 100 research papers and supervised 25 PhD students and 15 postdoctoral researchers. He holds a PhD in Neurocomputing from University College London and degrees in Electrical Engineering from Imperial College London and Ain Shams University, Egypt.

ABSTRACT

Imaging brain dynamics: between biophysics, machine learning and big data

Brain activity is dynamic: it unfolds over time, shifts between transient states, and reflects interactions between biological mechanisms, individual variability, behaviour and context. This talk will introduce how machine learning can help us study brain dynamics from neuroimaging data, linking data-driven methods with more biologically interpretable models of brain function. The session will present the challenge of modelling brain dynamics, from biophysical approaches that describe neural activity mechanistically to data-driven approaches that extract patterns from large-scale imaging datasets. I will discuss how methods such as hidden semi-Markov models can identify recurring brain states, estimate their temporal structure, and open new possibilities for neuroscience, health and applied data science.

KEYNOTE SPEAKER

Xu Lei

Southwest University, China

Function, Computation, and Application of Aperiodic Components in EEG

SHORT BIOGRAPHY

Xu Lei, Ph.D., Professor and Director of Sleep and NeuroImaging Center, Southwest University. Winner of National Program for Young Talents of China, Distinguished Professor of Chongqing "Bayu Scholar". He is the author or coauthor of more than 200 peer-review scientific papers, H-index: 46. His research interests include sleep experimental technique, sleep and emotion, sleep and memory.

ABSTRACT

Function, Computation, and Application of Aperiodic Components in EEG

Electroencephalography (EEG) spectral analysis has been widely applied in research and clinical settings. Emerging aperiodic analysis techniques enable the dissociation of broadband scale-free activity from oscillatory periodic components, yielding more “pure” estimates of rhythmic neural activity and offering novel interpretations of conventional EEG spectra. This report summarizes recent work conducted over the past years at the Sleep Neuroimaging Center of Southwest University, addressing three dimensions: temporal dynamics, state-related changes, and psychopathological correlates. First, in a developmental trajectory study of aperiodic indices across childhood and adolescence, we analyzed resting-state EEG spectra from nearly 7,000 healthy participants aged 6–18 years. Results revealed an age-related decrease in the aperiodic slope and increases in the center frequencies of both alpha and beta bands. Sex-based analyses further characterized differential EEG maturational profiles across developmental stages. Second, in the characterization and modeling of sleep microstates, multi-dimensional parameters derived from aperiodic analysis—particularly the slope, intercept, and alpha center frequency—provided more parsimonious quantitative markers for sleep microstate segmentation. A cortical-thalamic neural field model was employed to furnish a biologically interpretable mathematical framework for these observations. Third, in our most recent systematic review and meta-analysis on psychiatric disorders, we found significantly reduced aperiodic slopes across multiple conditions, with moderate effect sizes, supporting its potential as a neurophysiological biomarker. Future research should prioritize quality control measures, standardize data acquisition and analysis pipelines, and further elucidate the physiological and psychological functions of EEG aperiodic components.

KEYNOTE SPEAKER

Alexander Savostyanov

Novosibirsk State University, Russia

The EEG/fMRI reactions under emotional speech recognition as the markers of personality traits and affective disorders

SHORT BIOGRAPHY

Alexander Savostyanov is the Head of the Fundamental and Applied Linguistics Department at Novosibirsk State University. His research addresses the neurophysiology of emotional perception, speech recognition and motor control, as well as neurophysiological sources of individual differences and vulnerability to mental disorders. His work has included EEG/fMRI studies of anxiety, depressive tendencies and emotional-language processing across culturally diverse populations in Siberia and Mongolia.

PRESENTATION OVERVIEW

The presentation will examine EEG and fMRI responses during emotional speech recognition and their associations with personality traits and affective disorders. Attention will be given to individual and cultural variability in neural responses to emotionally salient language, and to the potential value of multimodal markers for understanding anxiety, depressive vulnerability and related clinical phenotypes.

KEYNOTE SPEAKER

Bratislav Mišić

Montreal Neurological Institute, McGill University, Canada

Integrating Anatomical, Metabolic, Genetic and Functional Information Across the Brain

SHORT BIOGRAPHY

Bratislav Mišić is an Associate Professor at the Montreal Neurological Institute, McGill University, where he leads the Network Neuroscience Lab. His group investigates how global dynamics, cognitive operations and complex behaviour emerge from interactions among distributed brain areas. The laboratory uses multimodal neuroimaging - including MRI, M/EEG and PET - together with network models to study communication on anatomical networks, brain network architecture, chemo architecture and disease propagation.

PRESENTATION OVERVIEW

How can anatomical wiring, metabolic demand, gene expression, neurotransmitter systems and functional activity be reconciled within a common account of brain organization? This keynote will present network-neuroscience strategies for integrating multiscale brain maps and for relating regional biological attributes to functional connectivity and dynamics. The presentation will consider the strengths and limitations of spatial correspondence, network topology and multimodal modelling, including emerging approaches that link individual functional connectomes to underlying neurotransmission.

KEYNOTE SPEAKER

Benjamin Becker

The University of Hong Kong, Hong Kong SAR, China

Opportunities for computational and AI strategies in neuroscience and mental health

SHORT BIOGRAPHY

Benjamin Becker is Professor in the Department of Psychology at The University of Hong Kong and leads the MIND & AI Lab. His research combines neuropsychology, cognitive and affective neuroscience, advanced neuroimaging, artificial intelligence, machine-learning-based neural decoding, computational modelling, pharmacological approaches and real-time fMRI-guided neuromodulation. His work examines how social-cognitive and affective processes interact with emerging technologies, become dysregulated in mental disorders and may be modulated to support innovative mental-health interventions.

PRESENTATION OVERVIEW

This keynote will examine how computational modelling and artificial intelligence can advance neuroscience and mental health. It will consider opportunities for neural decoding, individualized prediction, transdiagnostic characterization and AI-assisted intervention, while emphasizing interpretability, generalizability and responsible translation. The presentation will also address how emerging technologies and new forms of intelligence interact with social, cognitive and affective processes.

KEYNOTE SPEAKER

Stefania Ferraro

University of Electronic Science and Technology of China (UESTC), China

Headaches: What have we learned from neuroimaging?

SHORT BIOGRAPHY

Stefania Ferraro is a cognitive neuroscientist with over sixteen years of experience in the neuroimaging of pain and cognition. Her research applies functional, diffusion, and structural MRI to uncover the neural substrates of primary headache disorders — including migraine and cluster headache — and psychiatric conditions, with a particular focus on the role of the hypothalamus and the mesocorticolimbic dopaminergic system in pain and its chronification. She currently conducts this work at The Clinical Hospital of Chengdu Brain Science Institute, MOE Key Laboratory for Neuroinformation, Brain-Apparatus Communication Institute, University of Electronic Science and Technology of China (Chengdu, China).

ABSTRACT

Over the past twenty-five years, neuroimaging has taught us a great deal about primary headaches. Today I'll bring together our work on two of them — cluster headache and migraine — following a single thread across both: the role of the hypothalamus and the dopaminergic mesocorticolimbic system.

Across these two clinically distinct primary headaches, our imaging work converges on the same neural axis. In both cluster headache and migraine we find an enlarged hypothalamic paraventricular nucleus together with a consistent involvement of the dopaminergic mesocorticolimbic system. This convergence points to a shared hypothalamic–mesocorticolimbic vulnerability — and possibly to a hypodopaminergic state — as a candidate mechanism across primary headaches, and a promising treatment target.

KEYNOTE SPEAKER

María Antonieta Bobes León

Cuban Center for Neuroscience (CNEURO), Cuba

What Face-Recognition Disorders Reveal About the Human Face-Recognition System

SHORT BIOGRAPHY

María Antonieta Bobes León holds a PhD in Biological Sciences and is an Emeritus Researcher in Cuba's national science system and a Senior Researcher at the Cuban Center for Neuroscience, where she leads cognitive neuroscience projects and chairs the Master's Program in Neuroscience. She is an Associate Member of the Cuban Academy of Sciences. Her research focuses on the neural bases of face recognition, familiarity, emotion, and visual attention, combining psychophysics, electrophysiology, multimodal neuroimaging, connectivity analysis, and computational modeling in both healthy participants and neurological patients. She has led national and international research collaborations, trained several researchers, and published extensively on prosopagnosia, familiar-face processing, brain aging, and affective neuroscience.

ABSTRACT

Face-recognition disorders are clinically and mechanistically heterogeneous, and some patients exhibit strikingly selective impairments. Studying these cases provides a unique opportunity to identify the distinct computations and neural pathways required for normal face perception and recognition. We combined detailed psychophysical characterization, advanced structural and functional neuroimaging, connectivity analysis, and computational modeling to investigate three patients with different face-recognition disorders. This multimethod approach allowed us to relate behavioral deficits to lesion location, preserved and disrupted functional responses, large-scale and mesoscopic connectivity, and generate computational models that produce testable predictions.

One patient, FE, presented with severe difficulty recognizing familiar identities despite residual covert familiarity responses, whereas another, JR, presented with delusional misidentification despite preserved overt recognition.. Comparing these two patients revealed a functional and anatomical double dissociation between conscious identity recognition and autonomic familiarity responses. In FE, connections linking occipital and temporal face-processing regions were disrupted, whereas pathways connecting temporal regions with frontal systems were relatively preserved. In JR, the opposite pattern was observed, with preserved posterior visual-temporal connectivity but disrupted communication with frontal and affective systems. These complementary patterns support the existence of partially separable pathways for explicit recognition and affective familiarity, refining traditional models of face recognition.

A third patient, EP,.with impaired perceptual integration enabled a more detailed analysis of the computations required to construct coherent face representations. Surface-based lesion mapping and task-based functional MRI showed that canonical face-selective regions were largely structurally preserved and continued to respond preferentially to faces. However, structural and functional connectivity analyses revealed abnormal interactions across the broader visual-association network. Connective-field modeling indicated reduced spatial pooling across successive stages of the visual hierarchy (including V2), suggesting that local facial features were processed but insufficiently integrated into a unified percept. To test this interpretation, we experimentally restricted spatial integration in a trained deep neural network. This manipulation reproduced several key features of EP's behavioral impairment, providing a computationally explicit account of the deficit.

Together, these cases demonstrate that face recognition cannot be explained solely by the integrity of category-selective cortical regions. Successful recognition depends on coordinated interactions among specialized visual areas, semantic and memory systems, affective pathways, and frontal networks, as well as on computations that progressively integrate local visual information into stable representations of facial identity. Face-recognition disorders, therefore, offer a powerful model for revealing the distributed architecture and computational organization of the human face-recognition system.

KEYNOTE SPEAKER

Benjamin Klugah-Brown

University of Electronic Science and Technology of China (UESTC), China

Beyond Behavioral Labels: A 20 Years of Transdiagnostic Neuroimaging Signature of Behavioral Addiction

SHORT BIOGRAPHY

Dr. Benjamin Klugah-Brown is a Distinguished Associate Professor and Brain Research Scientist at the University of Electronic Science and Technology of China (UESTC), where he leads the BrainInformatics and Reward Systems (BIRS) Research Group within the Brain Connectivity Lab. He is also a member of the China–Cuba Belt and Road Joint Laboratory on Neurotechnology and Brain-Apparatus Communication at the School of Life Science and Technology.

Dr. Klugah-Brown received his Ph.D. in Biomedical Engineering (Brain Information and Brain- Inspired Intelligence) from UESTC in 2018, an M.S. in Computer Science and Engineering (Mathematical Algorithm Formulation) from UESTC in 2015, and a B.S. in Computer Science (Software Design and Implementation) from the University for Development Studies, Ghana, in 2010.

Leveraging a multidisciplinary background, his research integrates neuroimaging, artificial intelligence, computational modeling, and network neuroscience to investigate the neural mechanisms underlying psychiatric and neurological conditions, with particular emphasis on addiction, reward dysfunction, affective disorders, and brain network organization. His work combines large-scale functional and structural MRI analyses, machine learning, graph theory, and meta-analytic approaches to identify clinically meaningful biomarkers and develop computational tools for mental health assessment.

Dr. Klugah-Brown has authored / co-authored more than 80 peer-reviewed publications in leading journals, including Biological Psychiatry, Translational Psychiatry, NeuroImage, Human Brain Mapping, and Neuroscience & Biobehavioral Reviews, etc. He serves as an Associate Editor for Frontiers in Neuroimaging and actively supervises doctoral and master's students in biomedical engineering, computational neuroscience, and software applications for mental health.

ABSTRACT

Beyond Behavioral Labels: A 20 Years of Transdiagnostic Neuroimaging Signature of Behavioral Addiction

Do gambling disorder (GD), digital addictive behaviors, and related compulsive conditions represent distinct brain disorders, or diverse expressions of shared neurobiological vulnerability? Furthermore, are reported differences between disorders genuine biological signatures, or consequences of methodological variation, experimental tasks, and sampling biases?Despite two decades of neuroimaging research, whether behavioral addictions are best understood as distinct diagnostic entities or as context-dependent manifestations of shared neural vulnerabilities remains an open question.

Here, we synthesize a comprehensive program of evidence-based synthesis integrating 56 voxel-based morphometry studies (1,618 patients, 1,635 controls), 112 task-based fMRI and structural studies across these three conditions. Convergent gray matter reductions emerge in the anterior cingulate cortex and putamen across all disorders, implicating a core fronto-striatal circuitry for cognitive control, habit formation, and reward valuation, regardless of behavioral expression. Disorder- specific analyses initially suggest that gambling disorder is tied to caudate-related reward valuation, while digital addictions show more pronounced ACC and putamen alterations. Critically, however, when the literature is partitioned by task domain rather than diagnosis, reward paradigms versus cognitive-control paradigms are perfectly reproduced in this dissociation. The apparent “disorder-specific” differences are therefore largely driven by what we ask participants to do in the scanner, not by fundamentally distinct neurobiology.

Geographic moderator analysis exposes an equally profound sampling confound: Asian studies sample digital addictive behaviors almost exclusively, while western studies focus on gambling disorder, rendering geographic and disorder composition indistinguishable. Claims of cultural neuromodulation are mathematically/statistically impossible to evaluate with the existing literature; similarly, age effects are confounded by an eleven-year mean age gap between cohorts. Extending this evidence with network neuroscience and normative neurotransmitter maps, these macrostructural vulnerabilities map onto underlying dopamine and serotonin receptor distributions, suggesting a transdiagnostic imbalance between reward valuation, habitual behavior, and top-down control.

Together, these findings reinforce the emerging view that behavioral addictions are not defined solely by the behaviors through which they manifest, but arise from interactions between shared neurobiological vulnerabilities and environmental reinforcement contexts. They reveal a transdiagnostic architecture in which reward, habit-learning, and cognitive-control networks provide a common neural foundation, while developmental trajectories, task demands, and environmental exposure shape diverse compulsive behaviors. This shift from behavior-centered classification toward biologically grounded network models provides a framework for understanding addiction as a disorder of dynamic brain systems rather than isolated diagnostic entities, opening new avenues for precision assessment, prevention, and personalized intervention.

KEYNOTE SPEAKER

Wang Qing (Vincent)

Shanghai Mental Health Center, Shanghai China

Asymmetric Dual-Trajectory of Clinical and Neural Recovery for meditation in Schizophrenia

SHORT BIOGRAPHY

Wang Qing is an assistant researcher at Shanghai Mental Health Center and was a postdoctoral fellow at the Montreal Neurological Institute, McGill University. He has published more than 20 papers as first or corresponding author, with representative work in Advances in Methods and Practices in Psychological Science, Journal of Affective Disorders, International Journal of Eating Disorders, and Scientific Reports, etc. He serves as principal investigator of one hospital level key project and one open project of the Shanghai Institute of Traditional Chinese Medicine for Mental Disorders. He is a former co-chair of the Organization for Human Brain Mapping Hackathon and serves as a committee member of the Neuroimaging and Psychiatry Committee of the Chinese Society for Cognitive Science.

PRESENTATION OVERVIEW

Mind-body interventions, such as meditation, are increasingly integrated into psychiatric and neurological rehabilitation. Yet, the exact mechanisms by which these practices rewire the brain to heal the mind remain a critical black box. In clinical practice, there is a pervasive assumption that as a patient's core psychiatric symptoms resolve, their cognitive abilities—such as memory, processing speed, and executive function—will naturally recover in lockstep. However, clinical reality is rarely that simple. In this talk, we bridge the gap between clinical observation and advanced computational neuroinformatics to uncover the true biological mechanisms of recovery.

We conducted a longitudinal trial following patients undergoing either standard rehabilitation or rehabilitation augmented with a targeted meditation intervention over an eight-month period. By stepping away from simple group averages and instead utilizing latent class modeling to track distinct responder subgroups, we were able to observe the highly individualized trajectories of how symptom relief and cognitive improvement actually interact over time. We discovered a deeply counterintuitive phenomenon: while an early boost in cognitive function serves as a positive prognostic signal that a patient is responding well to treatment, this cognitive improvement is not the engine driving their symptom relief. The two tracks are, in fact, fundamentally decoupled. Patients can experience profound, compounding relief from their clinical symptoms without a parallel, sustained acceleration in cognitive recovery. We characterize this phenomenon as the "Asymmetric Dual-Trajectory."

To understand the biological "why" behind this behavioral decoupling, we examined the brain's intrinsic functional architecture using resting-state fMRI. We identified a specific spatial topology—the Extended Operculo-Supramarginal Network (eOSN)—as the primary biological driver. Within the eOSN, we uncovered a fierce, competitive axis between the brain's hyper-vigilant bottom-up "salience" hubs and its higher-order top-down executive hubs. We found that in order to achieve overarching symptom relief, the brain must actively suppress these hyper-active salience nodes. However, because of the rigid, anti-correlated wiring of the eOSN, turning down these survival networks inherently restricts executive processing. We term this biological tax the "allostatic cognitive brake."

Ultimately, the brain, during the intense process of psychiatric healing, cannot optimize for everything at once. By mapping this hidden structural trade-off, our work challenges the conventional wisdom of unified neurocognitive recovery. It offers a new, mechanistically grounded framework for understanding the true biological costs of clinical healing, paving the way for more targeted and realistic precision mind-body interventions.

KEYNOTE SPEAKER

Chanlin Yi

University of Electronic Science and Technology of China (UESTC), China

Neural Mechanisms of Collective Intelligence: An Inter-Brain Spatiotemporal Network Perspective

SHORT BIOGRAPHY

Chanlin Yi, Associate Professor, China-Cuba Belt and Road Joint Laboratory on Neurotechnology and Brain-Apparatus Communication, University of Electronic Science and Technology of China (UESTC). Her current research interests focus on constructing and analyzing brain networks, as well as their applications in cognition, clinical research, and brain-inspired artificial intelligence. She has published over 40 SCI papers in IEEE Transactions (T- CYB/T-NNLS/T-NSRE/T-CDS), Nature Mental Health, Science Advances, Neural Networks, etc., with over 10 first/corresponding-author papers (impact factor >10: 1; JCR Q1: 3), 1 ESI highly cited paper, 1 featured article in IEEE T-BME, and 1 Wiley Top Cited Article. Her work has received over 1,200 Google Scholar citations with an h-index of 20. She holds 5 authorized/pending patents and 3 software copyrights. She leads 6 funded projects, including the NSFC Young Scientists Fund (Category C), Postdoctoral Fellowship Program of CPSF (Category C), and Sichuan Science and Technology Program; and participates as a core member in 6 major/key projects from NSFC and MOST. She received the Third Prize of Sichuan Science and Technology Progress Award (ranked 4th) and the Outstanding Doctoral Dissertation Award.

PRESENTATION OVERVIEW

Collective intelligence emerges from interactions among multiple individuals. Understanding the inter-brain coordination mechanisms that support these interactions is therefore essential for elucidating the neural basis of collective intelligence. Using EEG hyperscanning and inter-brain spatiotemporal network analysis, we explore the dynamic evolution of inter-brain spatiotemporal networks across representative social contexts, including cooperation, competition, and strategic interaction. We further characterize the distinct neural representations associated with different social contexts and reveal the mechanisms of inter-brain coupling underlying collaborative decision-making and conflict resolution. Finally, we discuss the potential applications of this work in real-time brain function assessment, neurofeedback, and enhancing multi-person collaborative performance in extreme environments, such as space stations and high-altitude settings.

KEYNOTE SPEAKER

Shiang Hu

Institute of Brain-Computer Interface, School of Computer Science and Technology, Anhui University

Quantitative Methodological Advances in EEG Normative Modeling toward Precision Brain Health

SHORT BIOGRAPHY

Dr. Shiang Hu is an Associate Professor, a core researcher of the Institute of BCI, Anhui University. He received joint master-doctoral training at UESTC, MNI, and CNEURO. He has proposed a dBCI framework and contributed to unified-reference methods for EEG. Dr. Hu has published more than 40 papers in neuroscience, engineering, and medical informatics, and holds over ten BCI patents . His work has received honors including an IOP Highly Cited Paper Award, an IEEE JBHI Highlight Paper, a Wiley China Excellent Author Award, and recognition from the UN-SDG. He has led or participated in projects supported by the National Natural Science Foundation of China, the China Brain Project, and MITACS. His research focuses on neurocognition, brain-inspired computing, BCI, AI ethics and security.

PRESENTATION OVERVIEW

Resting-state electroencephalography (EEG) offers a scalable approach to precision brain health, but clinical translation is hindered by reference dependence, inconsistent preprocessing, and biologically ambiguous features. This report presents an end-to-end normative modeling framework. The rREST method reduces reference-related distortion, while the parallel-log-spectra index (PaLOSi) enables objective preprocessing quality control. A nonparametric ξ-π model robustly separates periodic oscillations from aperiodic activity. Using EEG from 1,628 healthy participants aged 5–97 years, lifespan models captured nonlinear age-related trajectories and achieved interpretable brain-age estimation (R^2 = 0.86; MAE = 2.95 years). Individual normative deviations were further integrated with generative brain-network models, geometry-informed graph learning, foundation models, and microstate modeling. In cognitive-disorder applications, geometry-informed fusion distinguished Alzheimer's disease and frontotemporal dementia with accuracies up to 98.69%. These advances support individualized deviation mapping, risk stratification, and scalable screening for precision brain health.

KEYNOTE SPEAKER

Ronaldo García Reyes

University of Electronic Science and Technology of China (UESTC), China

Spatial transcriptomic programs relate to Spectro laminar rhythms across macaque cortex

SHORT BIOGRAPHY

Ronaldo García Reyes is a postdoctoral researcher at the University of Electronic Science and Technology of China working at the intersection of spatial transcriptomics, cortical laminar organization and electrophysiological brain rhythms. His current work integrates molecular maps with spectrolaminar neural dynamics to examine how regional gene-expression programs relate to physiological organization across the macaque cortex.

PRESENTATION OVERVIEW

The presentation will examine spatial transcriptomic programs associated with spectrolaminar rhythms across macaque cortex. By aligning regional gene-expression profiles with electrophysiological activity across cortical layers and frequencies, the work seeks to identify molecular programs that help explain the laminar and spectral organization of cortical dynamics.

KEYNOTE SPEAKER

Carlos López-Naranjo

University of Electronic Science and Technology of China (UESTC), China

On applying artificial intelligence to the SCORE classification of EEG events.

SHORT BIOGRAPHY

Carlos López-Naranjo is a postdoctoral researcher at the University of Electronic Science and Technology of China whose work applies artificial intelligence and computational methods to electroencephalography. His presentation focuses on the application of AI to the standardized SCORE framework for classifying clinically relevant EEG events and supporting scalable, consistent EEG interpretation.

PRESENTATION OVERVIEW

The presentation will discuss applying artificial intelligence to the SCORE classification of EEG events. It will consider how models trained on standardized expert annotations can identify normal and abnormal recordings, classify epileptiform and non-epileptiform abnormalities, and support more consistent clinical review while preserving the role of expert oversight.

KEYNOTE SPEAKER

Anisleidy González-Mitjans

McGill University, Canada

Modelling epileptic transitions through anatomically grounded distributed delays

SHORT BIOGRAPHY

Anisleidy Gonzalez-Mitjans is a postdoctoral researcher at the Montreal Neurological Institute, McGill University, working in computational neuroscience and large-scale brain modeling. Her research uses biophysically grounded Neural Mass Models to investigate how synaptic and white-matter properties shape brain dynamics in health and disease. She is particularly interested in translating mechanistic brain modeling toward personalized and precision medicine.

PRESENTATION OVERVIEW

This work investigates how anatomically grounded distributed axonal delays shape epileptic state transitions in large-scale neural mass models. It examines how delay-mediated recruitment and epileptogenic accumulation interact to modulate seizure onset, persistence, and dynamical trajectories, providing a foundation for personalized whole-brain epilepsy modeling.

EMERGING INVESTIGATOR FLASH SPEAKER

Jiadong Yan

McGill University, Canada

Individual-Level Associations of Cognition and Personality With Adolescent Mental Health Vary Across Brain and Environmental Profiles

SHORT BIOGRAPHY

Jiadong Yan is a PhD candidate in the McGill Centre for Integrative Neuroscience, co-supervised by Alan Evans and Sherif Karama. His research uses computational modeling and large-scale developmental cohorts to study individual differences in adolescent cognition and mental health.

PRESENTATION OVERVIEW

This flash presentation will examine how associations of cognition and personality with adolescent mental health vary across brain and environmental profiles. Using longitudinal data from the ABCD Study, we integrate brain structural, environmental, and pubertal measures to characterize these associations at both the group and individual levels. The findings reveal substantial individualized heterogeneity and highlight prominent contributions from impulsivity-related traits, frontal and temporal brain regions, and environmental factors such as family conflict and weekend screen use.

EMERGING INVESTIGATOR FLASH SPEAKER

Yu Jin

University of Electronic Science and Technology of China (UESTC), China

Source-space precision charts for lifespan EEG connectomics

SHORT BIOGRAPHY

Yu Jin is an emerging investigator at the University of Electronic Science and Technology of China. His work focuses on source-space EEG connectomics and the development of precision charts that characterize lifespan trajectories in brain-network organization.

PRESENTATION OVERVIEW

This flash presentation will introduce source-space precision charts for lifespan EEG connectomics. The work aims to model normative trajectories in source-resolved brain networks and provide individualized measures of deviation across development and ageing.

EMERGING INVESTIGATOR FLASH SPEAKER

Hayat Boussaid

University of Electronic Science and Technology of China (UESTC), Chengdu, China

Simulation of Controlled Neural Circuits with Delayed Network Coupling

SHORT BIOGRAPHY

- PhD student in Biomedical Engineering (Neuroinformatics) at the University of Electronic Science and Technology of China (UESTC), Chengdu, China.
- Supervised by Professor Pedro Antonio Valdés-Sosa.
- Research interests: computational neuroscience, neural mass models, delayed brain networks, numerical integration, and control.

ABSTRACT

This presentation introduces a MATLAB toolbox for controlled neural-mass simulation with delayed network coupling. Symbolic Local Linearization and Van Loan augmentation generate controlled and uncontrolled integration steps without explicit Jacobian inversion. The framework supports piecewise dynamics, held control signals, and Connectome Tensor delays. Validation uses affine, piecewise, ZJR, tensor-contraction, and sampled-feedback tests. Future work targets distributed delays, EEG-informed estimation, and closed-loop control.

EMERGING INVESTIGATOR FLASH SPEAKER

Wu Kangjia (Kevin)

University of Electronic Science and Technology of China (UESTC), China

Lifespan Xi/Alpha Cortical Dynamics: Linking Age-Related Brain Maps to Gene Expression and Neurochemical Architecture

SHORT BIOGRAPHY

Wu Kangjia (Kevin) is a PhD student in the China-Cuba Laboratory at the University of Electronic Science and Technology of China. His research examines lifespan EEG dynamics and links age-related cortical patterns to gene-expression and neurochemical architectures, with the aim of connecting population neurophysiology to multiscale biological organization.

PRESENTATION OVERVIEW

This flash presentation will characterize lifespan Xi/alpha cortical dynamics and relate age-dependent neurophysiological maps to regional gene-expression and neurochemical architectures. The work aims to connect macroscopic EEG trajectories with multiscale biological features of the cortex.

EMERGING INVESTIGATOR FLASH SPEAKER

Loidel Barrera Rodríguez

University Havana, Cuba

Latent Space and Potentials from EEG

SHORT BIOGRAPHY

Loidel is an emerging investigator presenting work on latent representations and potential landscapes derived from EEG, with the goal of obtaining compact and interpretable descriptions of neural state organization.

PRESENTATION OVERVIEW

This flash presentation will introduce latent-space representations and potential landscapes for EEG. The approach seeks to reduce high-dimensional neural recordings to interpretable state variables and to characterize transitions, stability and recurrent patterns in brain dynamics.

EMERGING INVESTIGATOR FLASH SPEAKER

Sofia Albizu-Campos

University Havana, Cuba

Koopman Operator for nonlinear models of EEG

SHORT BIOGRAPHY

Sofia is an emerging investigator presenting work on Koopman-operator approaches for nonlinear EEG models, using linear representations of nonlinear dynamics to support analysis and interpretation of electrophysiological activity.

PRESENTATION OVERVIEW

This flash presentation will apply Koopman-operator methods to nonlinear EEG models. The approach represents nonlinear dynamics through observables that evolve approximately linearly, offering a route to interpretable analysis, prediction and control of electrophysiological states.

EMERGING INVESTIGATOR FLASH SPEAKER

Liuchang Feng (Anthony)

University of Electronic Science and Technology of China (UESTC), China

From High-Dimensional Neural Signals to Interpretable Stochastic Dynamics

SHORT BIOGRAPHY

Liuchang Feng is a PhD student in biomedical engineering and computational neuroscience, with research interests in EEG signal analysis, brain dynamics, and interpretable dynamical modeling. He received his Master's degree in Biomedical Engineering from the University of Electronic Science and Technology of China and his Bachelor's degree in Electronic and Information Engineering from Hainan University. His academic background includes medical signal processing, statistical analysis, and symbolic regression.

His current research focuses on discovering the governing equations and dynamical laws of brain electrophysiological activity, with the aim of moving beyond conventional descriptive EEG analysis and black-box data-driven prediction toward mechanistically interpretable models of neural dynamics. His research interests include latent-state modeling of high-dimensional neurophysiological data, stochastic differential equations, drift and diffusion estimation, and symbolic regression.

ABSTRACT

Understanding the dynamical principles underlying neurophysiological activity remains challenging because neural recordings are high-dimensional, noisy, and only indirectly related to the underlying physiological states. Conventional signal-processing and machine-learning approaches can provide useful descriptive features and predictive models, but they often offer limited insight into the dynamical mechanisms that generate the observed activity.

In this work, we explore a computational framework for identifying low-dimensional stochastic dynamics from multivariate neurophysiological time series. The central hypothesis is that complex neural observations may be represented by a smaller set of latent dynamical variables whose evolution can be described through interpretable stochastic models. Rather than optimizing dimensional reduction and dynamical modeling independently, we investigate representations according to their ability to preserve dynamically relevant information and support stable descriptions across temporal scales.

The inferred dynamics are subsequently analyzed from a geometric and physical perspective to distinguish qualitatively different forms of state evolution, including restoring behavior, recurrent or circulating dynamics, and stochastic fluctuations. This perspective provides a potential route for studying neural-state organization, transitions, and departures from dynamical equilibrium without relying exclusively on conventional spectral features or black-box prediction.

Finally, we investigate whether the resulting dynamical descriptions can be reduced to compact mathematical representations, providing a bridge between data-driven modeling and interpretable descriptions of neural dynamics. The broader objective is to establish a framework for moving from high-dimensional electrophysiological observations toward mechanistically meaningful dynamical models that may eventually facilitate comparisons across brain states, individuals, aging, and neurological conditions.

TENDEE INFORMATION

Program Notes

TIMING

Speakers are asked to arrive in the Spruce Room at least 15 minutes before their session. Chairs will enforce the published end time.

DISCUSSION

Questions are pooled at the end of each thematic block to promote synthesis across presentations.

FLASH TALKS

Emerging Investigator Flash Presentations are limited to five minutes. Presenters should use no more than three or four content slides.

LANGUAGE

The working language of the GBC scientific program is English.

VENUE INTEGRATION

Hotel-wide breaks, lunch, plenary keynotes and the closing ceremony follow the Belt and Road Brain Science Forum master schedule.

GLOBAL BRAIN CONSORTIUM 2026

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