INSTIUTE OF
SCIENCE
AND TECHNOLOGY
FOR BRAIN-INSPIRED
INTELLIGENCE

ISTBI Newsletter

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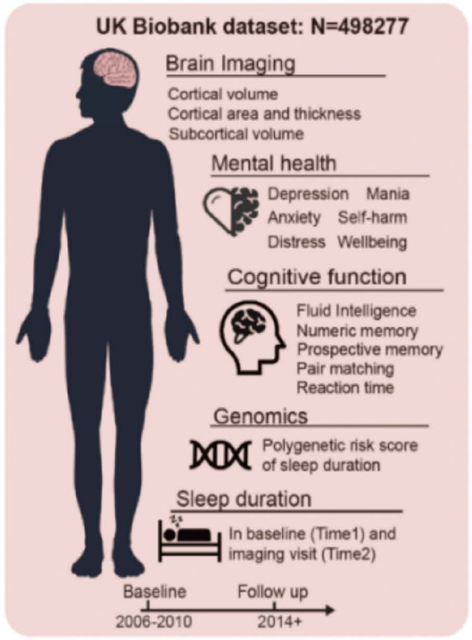
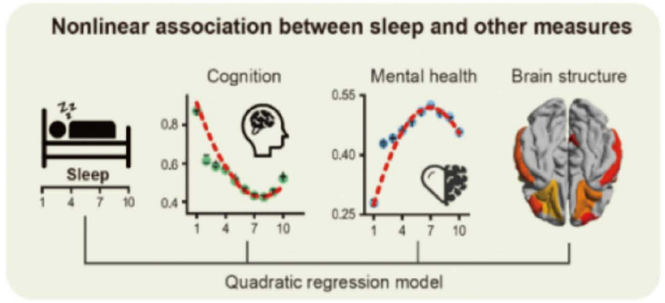
Research Highlights

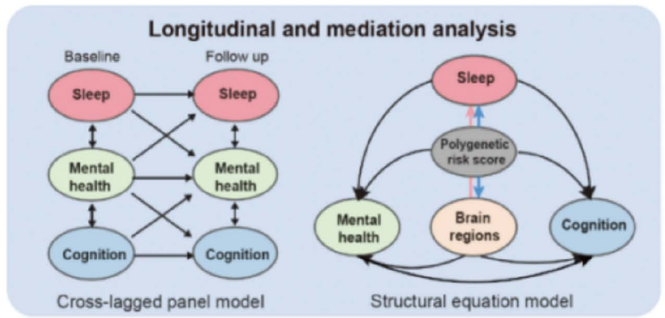
Seven hours of sleep is optimal in middle and old age, say researchers

In research published on 28 April 2022 in Nature Aging, scientists from Fudan University and the University of Cambridge examined data from nearly 500,000 adults aged 38-73 years from the UK Biobank. Participants were asked about their sleeping patterns, mental health and wellbeing, and took part in a series of cognitive tests. Brain imaging and genetic data were available for almost 40,000 of the study participants.

The researchers identified a nonlinear association between sleep, with approximately seven hours as the optimal sleep duration, and genetic and cognitive factors, brain structure, and mental health as key measures. The brain regions most significantly underlying this interconnection included the precentral cortex, the lateral orbitofrontal cortex and the hippocampus. Longitudinal analysis revealed that both insufficient and excessive sleep duration were significantly associated with a decline in cognition on follow up. Furthermore, mediation analysis and structural equation modeling identified a unified model incorporating polygenic risk score (PRS), sleep, brain structure, cognition and mental health.







PhD student Yuzhu Li and Distinguished Professor Barbara J. Sahakian are the first authors of this study. Distinguished Professor Jianfeng Feng and Young Principal Investigator Wei Cheng (ISTBI) are the corresponding authors.

» Full Article:
Li, Y., Sahakian, B.J., Kang, J. et al. The brain structure and genetic mechanisms underlying the nonlinear association between sleep duration, cognition and mental health. Nat Aging 2, 425–437 (2022). https://doi.org/10.1038/s43587-022-00210-2

[About the Authors]

Prof. Barbara J. Sahakian

Barbara J. Sahakian is Distinguished Professor at Fudan University Institute of Science and Technology for Brain-inspired Intelligence and Professor of Clinical Neuropsychology at the University of Cambridge Department of Psychiatry and Behavioural and Clinical Neuroscience Institute, specializing in psychopharmacology, neuropsychology, neuropsychiatry, neuroimaging and neuroethics. She is a Fellow of the British Academy and the Academy of Medical Sciences. She is best known for her work on 'hot' and 'cold' cognitive deficits in depression and early detection and early treatment with cholinesterase inhibitors in Alzheimer's disease. She co-invented the neuropsychological CANTAB and EMOTICOM tests. She is co-author of Bad Moves: How Decision Making Goes Wrong, and the Ethics of Smart Drugs (Oxford University Press, 2013) and Sex, Lies, & Brain Scans (Oxford University Press, 2017) and co-editor of The Oxford Handbook of Neuroethics.

Ms. Yuzhu Li

Yuzhu Li is the PhD student of Fudan University Institute of Science and Technology for Brain-Inspired Intelligence. She is interested in genetic and neural mechanisms of sleep disorder and the risk factors of psychiatric disorders and neurodegenerative disorders. She has published papers in Nature Aging, Molecular Psychiatry and Biological Psychiatry etc.

[About the Authors]

Prof. Jianfeng Feng

Jianfeng Feng is Chair Professor at Shanghai National Centre for Mathematic Sciences, Dean of Institute of Science and Technology for Brain-inspired Intelligence and Dean of School of Data Science at Fudan University. He has been developing new mathematical, statistical and computational theories and methods to meet the challenges raised in Brain Science and mental health researches. Recently, his research interests are mainly in big data analysis, mining for neuroscience and brain diseases and developing brain-inspired algorithms and theory. He was recognized as one of the Chinese Most Cited Researchers in Neuroscience of 2019 and one of the Chinese Most Cited Researchers in Mathematics of 2020 and 2021 by Elsevier. He was also named the 2020 World's Top 2% Scientists by Stanford University.

Dr. Wei Cheng

Wei Cheng is now a Young Principle Investigator at Institute of Science and Technology for Brain-Inspired Intelligence, Fudan University. He obtained a Ph.D. in Applied Mathematics from Fudan University, supervised by Prof. Jianfeng Feng. Dr. Cheng completed postdoctoral fellowship at the Department of Statistics of Fudan University from Jul, 2016 to April, 2018, during which he visited University of Warwick, UK as exchange scholar for one year. Dr. Cheng is the recipient of National Scholarship for Doctoral Students, The National Natural Sciences Foundation of China, Shanghai Sailing Program Research Grant, among many other awards and grants in the last five years.

The Biomedical-AI group identified unique contributions of noncoding regulation in non-brain tissues to the shared mechanisms of neuropsychiatric disorders

Neurological and psychiatric disorders have complicated etiologies and are difficult to treat or manage. Many of these disorders have overlapped phenotypic profiles, but the underlying mechanisms cannot be fully explained through known disease genes and genomic variants. Drs Xing-Ming Zhao and Jingqi Chen from the Biomedical-AI group at the ISTBI, Fudan University have investigated the tissue-specific contributions of noncoding genomic variants to the shared mechanisms of neuropsychiatric disorders. They have constructed a comprehensive tissue-specific disorder similarity network, and found that non-brain tissues have their unique, indispensable roles in these disorders. This study may provide new ideas and potential drug targets for future development of drugs and systematic interventions for the neuropsychiatric disorders. This work was published in Molecular Psychiatry on 4 April 2022.

Dr. Jingqi Chen, a young associate researcher in the biomedical AI team of the ISTBI, is the first author of this study. Drs. Xing-Ming Zhao and Jingqi Chen are co-corresponding authors.

» Full Article:

Chen, J., Song, L., Yang, A. et al. Disrupted long-range gene regulations elucidate shared tissue-specific mechanisms of neuropsychiatric disorders. Mol Psychiatry 27, 2720–2730 (2022). https://doi.org/10.1038/s41380-022-01529-3

[About the Authors]

Dr. Jingqi Chen

Jingqi Chen graduated from Fudan university with a Ph.D. in bioinformatics, and did her postdoctoral research in University of California, Berkeley. She mainly studies the roles of the noncoding genome in neurological and psychiatric diseases, through multi-omics data-driven approaches. In particular, current research goals include: (1) understanding the genetic roles and clinical impact of rare SNPs and SVs in Alzheimer's disease and Schizophrenia; (2) identifying and interpreting disease-relevant repeat elements/endogenous retrovirus in the context of brain disorders. Both goals are powered by big and diversed local and public data, and the design of biologically meaningful bioinformatics methods.

[About the Authors]

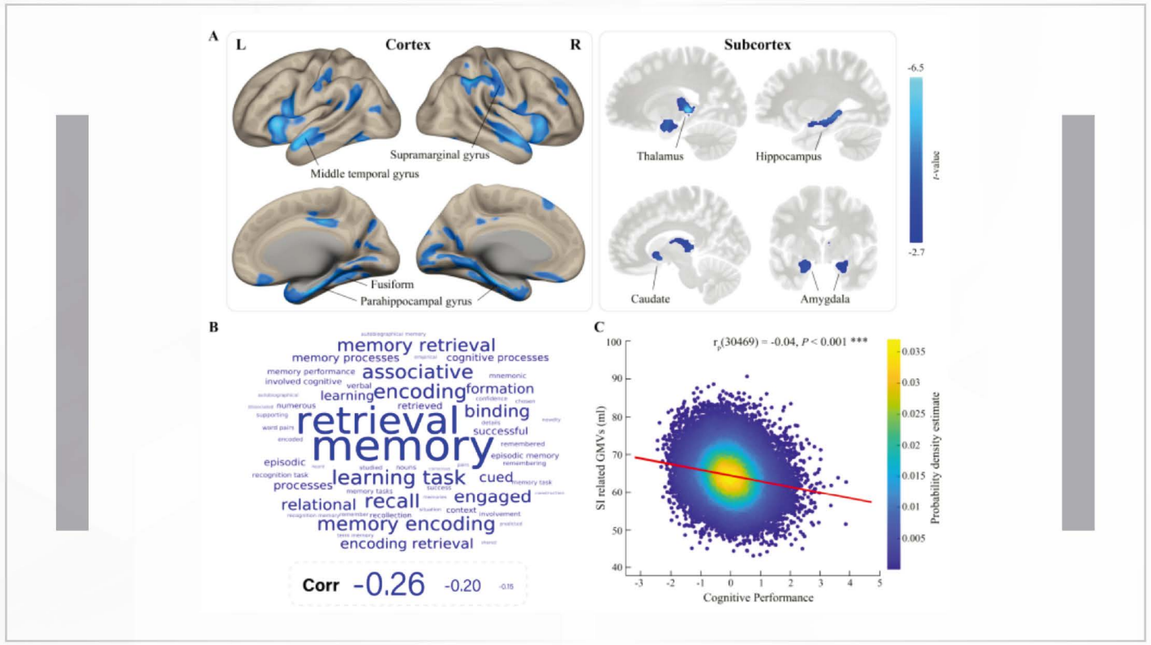
Prof. Xing-Ming Zhao

Xing-Ming Zhao is Professor at Institute of Science and Technology for Brain-Inspired Intelligence, Fudan University; Deputy Director of Key Laboratory of Computational Neuroscience and Brain-Inspired Intelligence, Ministry of Education; Executive director of Zhangjiang International Brain Bank; Shanghai Youth Science and Technology Star; candidate of Shanghai Pujiang Talent Program; IEEE Senior Member; IEEE SMC TC on Systems Biology Co-Chair; IEEE SMC Shanghai Chapter Chair; ACM SIGBio China Vice Chair; CCF Senior Member; Deputy Director of Professional Committee of Bioinformatics and Artificial Life, Chinese Association of Artificial Intelligence; Standing member of Technical Committees of Bioinformatics, China Computer Federation; Director of Technical Committees of Bioinformatics, Shanghai Computer Society; etc.

Social isolation may impact brain volume in regions linked to higher risk of dementia

Researchers from Fudan University, the University of Cambridge and the University of Warwick found that social isolation was linked to a 26% increased risk of dementia, separately from risk factors like depression and loneliness. The study was published in Neurology on 8 June 2022.

The study looked at over 460,000 people across the United Kingdom with an average age of 57 at the beginning of the study who were followed for nearly 12 years before the pandemic. Of those, almost 42,000 (9%) reported being socially isolated, and 29,000 (6%) felt lonely. During the study, almost 5,000 developed dementia. Researchers collected survey data from participants, along with a variety of physical and biological measurements, including MRI data. Participants also took thinking and memory tests to assess their cognitive function. Of the 42,000 people with social isolation, 649 (1.55%) developed dementia, compared to 4,349 (1.03%) of those people who were not socially isolated. Socially isolated individuals had lower volume in the brain's gray matter in various regions involved with learning and thinking. People who were socially isolated were 26% more likely to develop dementia than those with no social isolation.



» Full Article:
Shen, C. et al. Associations of Social Isolation and Loneliness With Later Dementia. Neurology; 8 June 2022. https://doi.org/10.1212/WNL.0000000000200583

[About the Authors]

Dr. Chun Shen

Chun Shen is Postdoctoral Research Fellow at Institute of Science and Technology for Brain-Inspired Intelligence, Fudan University with a Ph.D. in Biomedical Engineering. Her research interests include mental disorders and multimodal brain imaging. Her works have been published in world-renowned scientific journals such as American Journal of Psychiatry, Biological Psychiatry, etc. She is a project leader of National Natural Science Foundation of China (NSFC) Distinguished Young Scholar fund and is selected for Shanghai Super Postdoctoral Fellowships, which is one of the prestigious fellowships in China.

2022 ISTBI Postdoc Seminar

On 20 May, the 2022 ISTBI Postdoc Seminar was held online. Fourteen postdoctoral researchers presented on their research projects.

1.**Di Chen**: Brain Signatures during Reward Anticipation Predict Persistent Attention-deficit / Hyperactivity Disorder Symptoms

2.**Hongying Zhang**: Effects of spaceflight on circadian rhythm and sleep-wake of mice

3.**Yingnan Nie**: Closed-loop deep brain stimulation in Parkinson's disease

4.**Yi Zhang**: Spatial temporal patterns in resting-state neuroimaging

5.**Yuchao Jiang**: Neuroimaging subtyping of schizophrenia based on progressive brain atrophy model

6.**Ming Yang**: Acute ischemic stroke patient selection using regular CT images

7.**Linbo Wang**: Study on the subtype of Parkinson's disease and the mechanism of disease progression based on neuroimaging

8.**Yongliang Cao**: The role of Abl2 in regulating microglia migration and neural function remodeling after cerebral ischemia

9.**Celio Dias Santos Junior**: AMPSphere: Global survey of prokaryotic antimicrobial peptides shaping microbiomes

10.**Konstantinos Mavreas**: Investigations of stochastic behavior in biological processes and genetics

11.**Xinyu Liang**: Investigating of brain functional connectomes with naturalistic stimuli at ultra-high field fMRI

12.**Yunjun Sun**: Environmental factors, brain structural development, and cognitive performance and mental health in adolescents

13.**Anna Maria Cusco Marti**: Large-scale investigation on animal-associated microbiomes in health and disease

14.**Svetlana Ugarcina Perovic**: Challenges in metagenomic annotation of antibiotic resistome

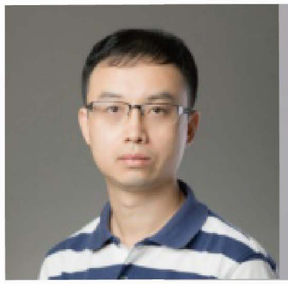
Exchange and Collaboration

Shanghai Municipal Science and Technology Major Project — Brain and Brain-inspired Intelligence: Technology Transfer Symposium

On 22 June 2022, the ISTBI and Shanghai Science & Technology Investment Co. Ltd. held an online Technology Transfer Symposium for the Shanghai Municipal Science and Technology Major Project - Brain and Brain-inspired Intelligence. The two parties discussed the intention of transferring the first nine research achievements of the Project, which center around the two themes of “Artificial Intelligence and Brain-inspired Intelligence” and “Biomedicines and Intelligent Diagnosis and Treatment”.

Theme 1: Artificial Intelligence and Brain-inspired Intelligence

» *Achievement 1.1 : Hybrid vehicle route planning system*



Prof. Wenlian Lu

Professor, School of Mathematical Sciences, Fudan University

The research team developed an AI algorithm customization system for the prediction, planning, decision and data mining of transportation, storage, scheduling, transfer, network and after-sales, targeting the industries of retail, express, delivery and logistics and manufacturing supply chain management. In partnership with the SAIC, this system has been applied to its supply chain business. Comparing with the previous human scheduling, the new system achieved a 6% decrease in total mileage, a 4.7% increase in loading rate, a 11.5% decrease in the number of vehicles, and the scheduling efficiency was increased for 500 times. In the meanwhile, the team’s cooperation with Shanghai Fuller Technology Information Co., LTD. in logistics and planning also has good performance.

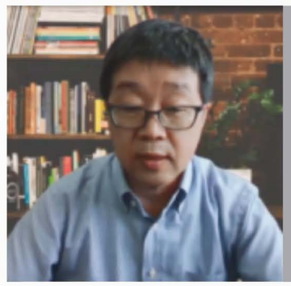
» *Achievement 1.2 : Innovative application of brain-inspired AI algorithms in autopilot*

Prof. Xiangyang Xue

Professor, Institute of Science and Technology for Brain-inspired Intelligence, Fudan University

The research team developed brain-inspired AI algorithms such as monocular 2D and 3D image target detection, bird's eye view object detection and classification, lidar semantic segmentation, vehicle trajectory prediction, and map building navigation, and installed the first-stage algorithms on FAW HongQi self-driving vehicle. The team has published over 20 papers in top conferences and journals, and set up a joint laboratory with FAW (Nanjing) to carry out close industry-research cooperation.

» *Achievement 1.3 : Bionic binocular vision system*



Prof. Xiaolin Zhang

Professor, Institute of Science and Technology for Brain-inspired Intelligence, Fudan University

The automatic monitoring and navigation scheme developed by the research team is mainly based on bionic binocular vision sensor, partially using IMU and other sensors, which can be

connected to a variety of other auxiliary sensors simultaneously. Compared with the currently prevalent laser navigation scheme, the binocular vision sensor is advantageous in shorter deployment time, higher positioning accuracy, more comprehensive obstacle avoidance function, richer visual data, and less costs. Currently, the binocular vision sensor is being used in Shanghai Metro's pantograph detection system and the automatic wafer handling robot in semiconductor production line.

» *Achievement 1.4: Intelligent infrared inspection*

Deputy Dean Yong Zhang &
Director Nannan Yan

State Grid Power Shanghai Co., Ltd.
China Electric Power Research Institute

The research team cooperated with State Grid Power Shanghai Co., Ltd. to develop an automatic state assessment scheme for key equipment of smart grid, based on infrared thermal imaging map analysis of substation robot inspection. As the world's first power infrared vision intelligent detection device, its functions include intelligent equipment identification, shooting guide, image quality optimization, fast intelligent diagnosis, and one-click report generation.In 2021, the device was used in the daily operation and maintenance of primary equipment in several stations such as 1000kV UHV Lientang Substation and ±500kV Huaxin DC converter station of Shanghai Company. The effective recognition accuracy was 98%, the infrared diagnosis time was reduced by about 70%, and the overall efficiency was increased by more than 3 times.

Theme 2: Biomedicines and Intelligent Diagnosis and Treatment

» *Achievement 2.1: Drug Design Based on AuTophagy-TEthering Compounds*

Prof. Boyun Lu

Professor, School of Life Sciences, Fudan University

The automatic monitoring and navigation scheme developed by the research team is mainly based on bionic binocular vision sensor, partially using IMU and other sensors, which can be connected to a variety of other auxiliary sensors simultaneously. Compared with the currently prevalent laser navigation scheme, the binocular vision sensor is advantageous in shorter deployment time, higher positioning accuracy, more comprehensive obstacle avoidance function, richer visual data, and less costs. Currently, the binocular vision sensor is being used in Shanghai Metro's pantograph detection system and the automatic wafer handling robot in semiconductor production line.

» *Achievement 2.2: F-STROKE: brain-imaging software for stroke risk assessment*

Dr Ming Yang

Postdoctoral Research Fellow, Institute of Science and Technology for Brain-inspired Intelligence, Fudan University
CEO, NeuroBlem

F-STROKE is a brain-imaging software for assessing stroke risks. Its core technologies include rapid automatic quantification of ischemic penumbra and infarct core, localization of ischemic lesions in brain area and quantitative evaluation of collateral blood flow, which solves

Exchange and Collaboration

the problem of quantitative imaging reference in the selection of thrombolysis and thrombectomy after the onset of acute ischemic stroke. F-STROKE has obtained the second class medical device registration certificate, and has been selected as the image screening software by large multi-regional studies in China such as MERIT and BASILAR2. It is currently used by stroke centers in more than 130 hospitals, serving more than 20,000 acute stroke patients per year.

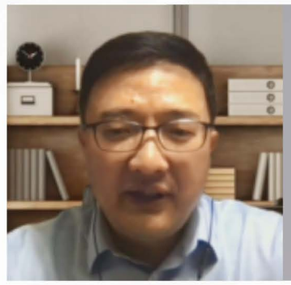
» *Achievement 2.3: Intelligent brain-computer interaction*

Prof. Shouyan Wang

Research Professor, Institute of Science and Technology for Brain-inspired Intelligence, Fudan University

For brain health intervention and brain disease treatment, the research team established a brain-computer interaction neuromodulation algorithm and a modeling technology and developed an intelligent neuromodulation system and digital perception and cognitive intervention system. The research team applied for 25 patents and earned 6 patents and 1 software copyright, constructing a patent pool of algorithm, software and system in the field of brain-computer interface and neuromodulation. Among the developed technologies, the “digital insomnia therapy” has entered into the stage of large-scale application, promotion and translation; the “intelligent brain-computer interaction platform” is awarded a Silver Medal in the International Exhibition of Inventions of Geneva, which is currently undertaking the development and translation of non-invasive intelligent neuromodulation and other devices.

» *Achievement 2.4: PaWei App and online smart evaluation*



Prof. Jian Wang

Professor, Huashan Hospital, Fudan University

The research team developed “PaWei”, an app designed for managing Parkinson’s Disease, and collaborated with the National Clinical Medical Research Center for Geriatric Diseases of Huashan Hospital to establish the “China E-Pa Alliance”, being China’s first online mobile platform that combines Parkinson’s Disease management app and real world clinical research. Since its launch in April 2017, the app has gradually added patient-education news, doctor-patient interactive consultation, quantitative voice analysis, quantitative analysis for motion video capture, patient forum and other functions during its annual updates, and its number of users and user . adhesiveness have been significantly increased. Until now, the app covers 26 provinces and over 130 hospitals in China, attracting 18,000+ registered users, 600,000+ views, 9,700+ uploaded motion test videos, 6400+ test audios, and 14,000+ times of consultation.

The market investment team pointed out the core technical advantages, marketization prospects and transfer modes of each project, and put forward suggestions on how to better promote the transfer of project outcomes. During the conclusion session, the Institute and the Company discussed opportunities of technology transfer and market investment, prospects, and collaboration.

Exchange and Collaboration

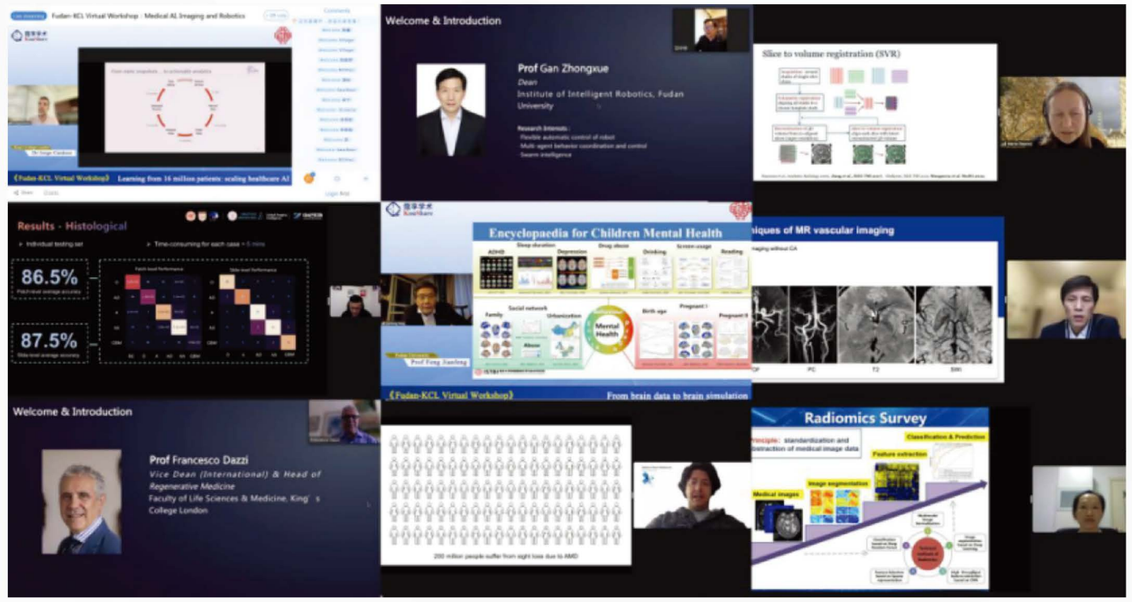
Fudan-KCL Workshop: Medical AI, Imaging and Robotics

Following a Memorandum of Understanding signed between Fudan University and King's College London in 2017, the two institutions shared an increasing interest in research and education collaboration. To promote this aim, the ISTBI and the School of Biomedical Engineering and Imaging Sciences (BMEIS) at KCL co-held the "Medical AI, Imaging and Robotics" Workshop on 13 May.

The welcome remarks were given by Prof. Wang Shouyan (Deputy Dean, ISTBI, Fudan), Prof. Gan Zhongxue (Dean, Institute of Intelligent Robotics, Fudan), Prof. Sebastien Ourselin (Head, BMEIS, KCL), and Prof. Francesco Dazzi (Vice Dean and Head of Regenerative Medicine, Faculty of Life Sciences & Medicine, KCL).

Eight researchers from the two institutions showcased their research outcomes in medical AI, medical imaging, and surgical robots:

Speakers	Title
Prof Feng Jianfeng Dean, Institute of Science and Technology for Brain-Inspired Intellignece & School of Data Science, Fudan University	From brain data to brain simulation
Dr Maria Deprez Senior Lecturer in Medical Imaging, School of Biomedical Engineering & Imaging Sciences, King's College London	Artificial intelligence for fetal and neonatal MRI
Prof Wu Jingsong Professor & Chief Physician in Neurosurgery, Huashan Hospital, Fudan University	AI Neuropathologist for Brain Tumour Identification
Prof Dr Jorge Cardoso Reader of Artificial Medical Intelligence, King's College London	Learning from 16 million patients: scaling healthcare AI
Prof Yu Jinhua Professor, Department of Electronic Engineering, Fudan University	Intelligent diagnosis based on multimodal medical images
Dr Christos Bergeles Reader of Surgical Robotics, School of Biomedical Engineering & Imaging Sciences, King's College London	Image-guided robotic retinal surgery
Prof Wang He Professor & Director of Zhangjiang International Imaging Centre, Institute of Science and Technology for Brain-inspired Intelligence, Fudan University	Imaging-based quantification of vascular morphology and flow
Dr Xia Wenfeng Lecturer and International Lead, School of Biomedical Engineering & Imaging Sciences, King's College London	Packing sound and light into a smart needle for surgical guidance

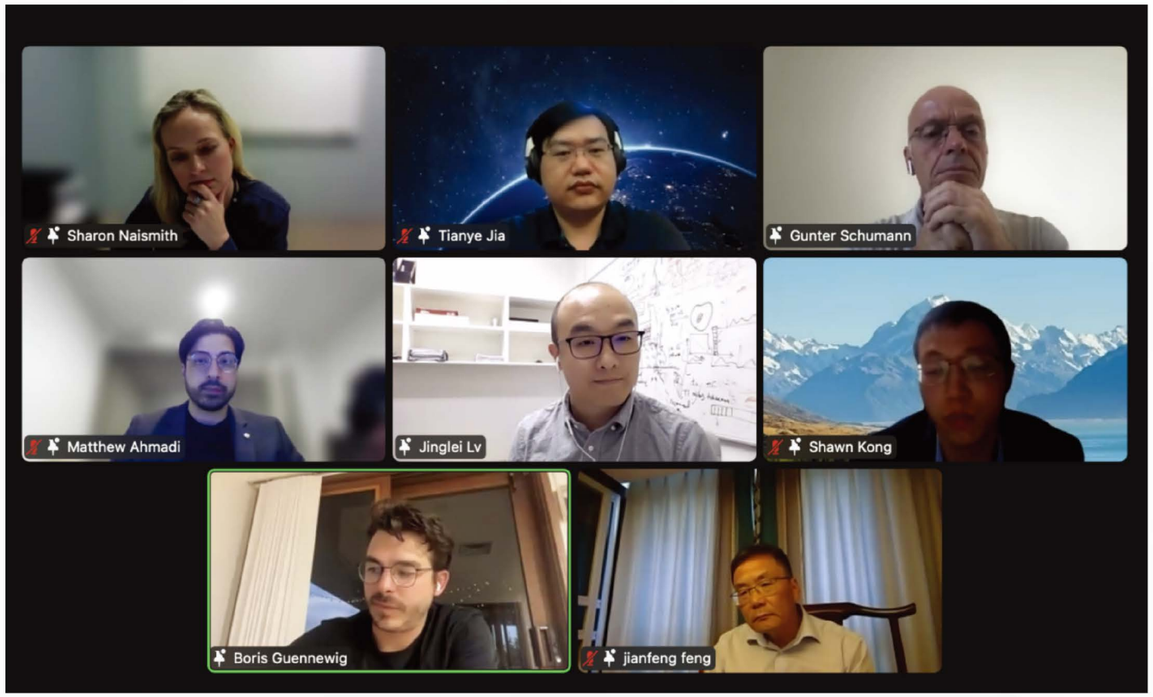


Exchange and Collaboration

Fudan-Sydney Workshop: Use Large Open-Access Datasets to Understand Brain and Mental Health & Launch of New BISA Seed Fund Programs

The availability of many large open-access datasets in recent years has provided new ways for researchers to unravel the mysteries of human brain and find solutions to tackle mental health challenges. On 20 July, the ISTBI and the University of Sydney held the “Use Large Open-Access Datasets to Understand Brain and Mental Health” Workshop, bringing together researchers from the two institutions to share their practical tips and experience with UK Biobank, Human Connectome Dataset, IMAGEN study, etc. This virtual workshop also aimed to strengthen research links and momentum of the Fudan-Sydney Brain and Intelligence Science Alliance (BISA) and promote cross-institutional multi-disciplinary research collaborations.

Speakers	Title
Prof. Qiang Luo Institute of Science and Technology for Brain-Inspired Intelligence, Fudan University	Population Neuroscience Approach to the Developmental Mechanisms of Mental Disorders
Dr Matthew Ahmadi Postdoctoral Research Fellow, Charles Perkins Centre, Faculty of Medicine and Health, University of Sydney	Physical Activity, Sleep, and Brain Health: The Utility of Wearable
Prof. Tianye Jia Institute of Science and Technology for Brain-Inspired Intelligence, Fudan University	Experience of using data from IMAGEN and ABCD studies
Dr Jinglei Lv Senior Lecturer, School of Biomedical Engineering, Sydney Imaging, Brain and Mind Centre,	A Multimodal Brain Template Built with the Human Connectome Dataset
Prof. Gunter Schumann Head of Centre for Population Neuroscience and Precision Medicine (PONS), Institute of Science and Technology for Brain-Inspired Intelligence, Fudan University	Environmental profiles of urban living relate to regional brain volumes and symptom groups of mental illness through distinct genetic pathways



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At the workshop, Prof. Shouyan Wang and Prof. Sharon Naismith, the Academic Leads of BISA, announced the funding calls of three new BISA seed fund programs that support collaborated initiatives between the two universities:

- BISA Flagship Research Program

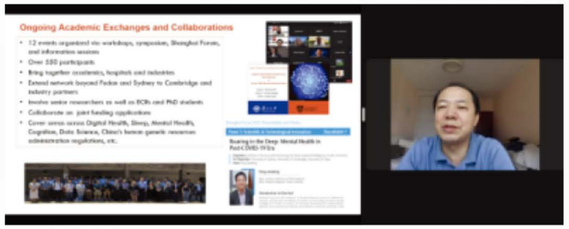
to support two joint projects over two years, targeting teams of researchers to strengthen existing collaborations on high-impact projects (each awarded project may receive up to CNY¥455,000 per year from each university),

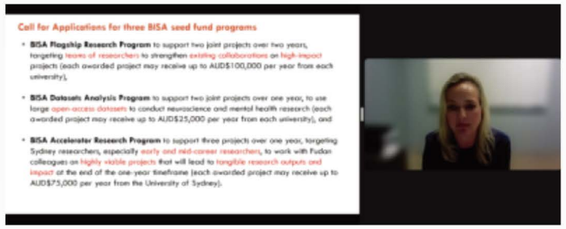
- BISA Datasets Analysis Program

to support two joint projects over one year, to use large open-access datasets to conduct neuroscience and mental health research (each awarded project may receive up to CNY¥113,800 per year from each university), and

- BISA Flagship Research Program

to support three projects over one year, targeting Sydney researchers, especially early and mid-career researchers, to work with Fudan colleagues on highly viable projects that will lead to tangible research outputs and impact at the end of the one-year timeframe (each awarded project may receive up to AUD$75,000 per year from the University of Sydney).

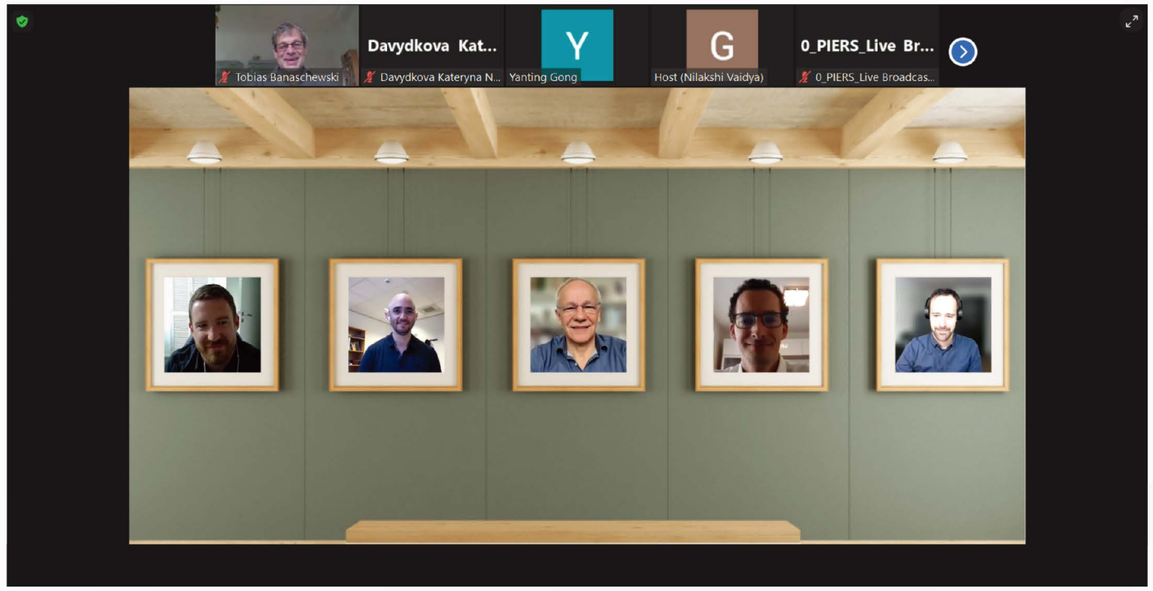




PONS: The environMENTAL Seminars 3-5

The “environMENTAL” is a recently funded project by the European Commission that aims at identifying the molecular and neural mechanisms of environmentally-induced mental illness. It integrates expertise from a wide range of scientific disciplines, including neuroscientists, psychiatrists, geo-scientist, climatologists, psychologists, epidemiologists, anthropologists, sociologists, computer scientists, experts in digital interventions as well as non-academic stakeholders. This year, 5 environMENTAL seminars were held by the ISTBI’s Centre for Population Neuroscience and Precision Medicine (PONS).

The Seminar 3: Establishment of quantitative neurobiological biomarkers for prediction and stratification of environmentally-related mental illness, Seminar 4: Development of pharmacological, cognitive and educational interventions targeting molecular and neurobiological mechanisms of environmentally-sensitive symptoms of mental illness, Seminar 5: Establishing a programme of responsible research and innovation took place from 23 May to 5 July. The PONS invited famous scientists both from China and abroad: Andre Marquand, Peter Sommer, Bernd Carsten Stahl etc. All of the three seminars have achieved great results and cast wide influences.



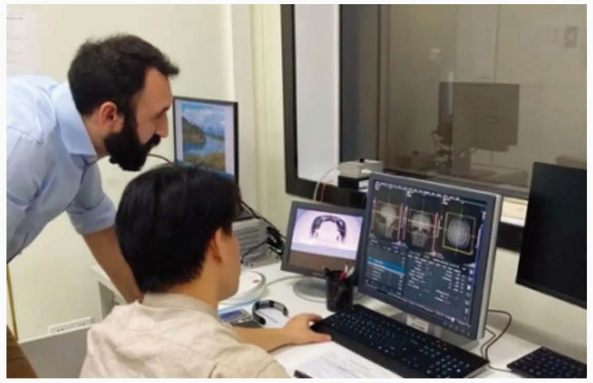
Scientist at ISTBI

Young Principal Investigator

Deniz Vatansever

Dr. Deniz Vatansever is a Young Principal Investigator at the ISTBI. Prior to his move to Shanghai, he obtained his PhD from the University of Cambridge in Clinical Neurosciences at the Cognition and Consciousness Imaging Group, and later joined the Department of Psychology, Semantics and Mind-wandering Laboratory at the University of York for his post-doctoral work.

Currently, he is leading a Cognition and Brain Imaging Laboratory at ISTBI, with a long-term ambition to unravel the neural mechanisms behind learning, memory and decision-making, and to apply brain-inspired intelligence to the development of future generation adaptable systems. His lab employs integrative, systems-level approaches from cognitive, and clinical and computational neurosciences, spanning research areas such as brain-based object and concept classification, value-based decision making, aesthetic appreciation and neural plasticity.



In addition to receiving competitive research grants from the National Natural Science Foundation of China, he has published his research findings in international journals including Nature Communications, Journal of Neuroscience, Human Brain Mapping, Neuroimage and Proceedings of the National Academy of Sciences, USA. Positions are available in his laboratory for graduate students (MSc/PhD), research assistants and post-doctoral researchers.

In June 2022, Dr. Vatansever's research project "Decision Spaces: Investigating the Role of Cognitive Maps in Human Decision-Making Based on Ultra-high fMRI" was funded by the ***"Science and Technology Innovation 2030 - Major Project (Neuroscience and Brain-inspired Intelligence)" Fund.***

The "Science and Technology Innovation 2030 - Major Project (Neuroscience and Brain-inspired Artificial Intelligence)" is a major project launched by the Ministry of Science and Technology of the PRC in 2018 under the guidance of the National 13th Five-Year Plan for S&T Innovation issued by the State Council. The main goal is to unravel the mysteries of the human brain, tackle challenges in brain disease treatment and develop the new generation of brain-inspired artificial intelligence.