

[IBI Data Standards and Sharing Working Group]

Data Standardization & Utilization in South Korea



Nov 14, 2022

Korea Brain Research Institute

Ja Wook Koo, Ph.D.

Korea Brain Research Institute (KBRI)

- First Gov't endowed Institute for Brain Research in Korea, 2011

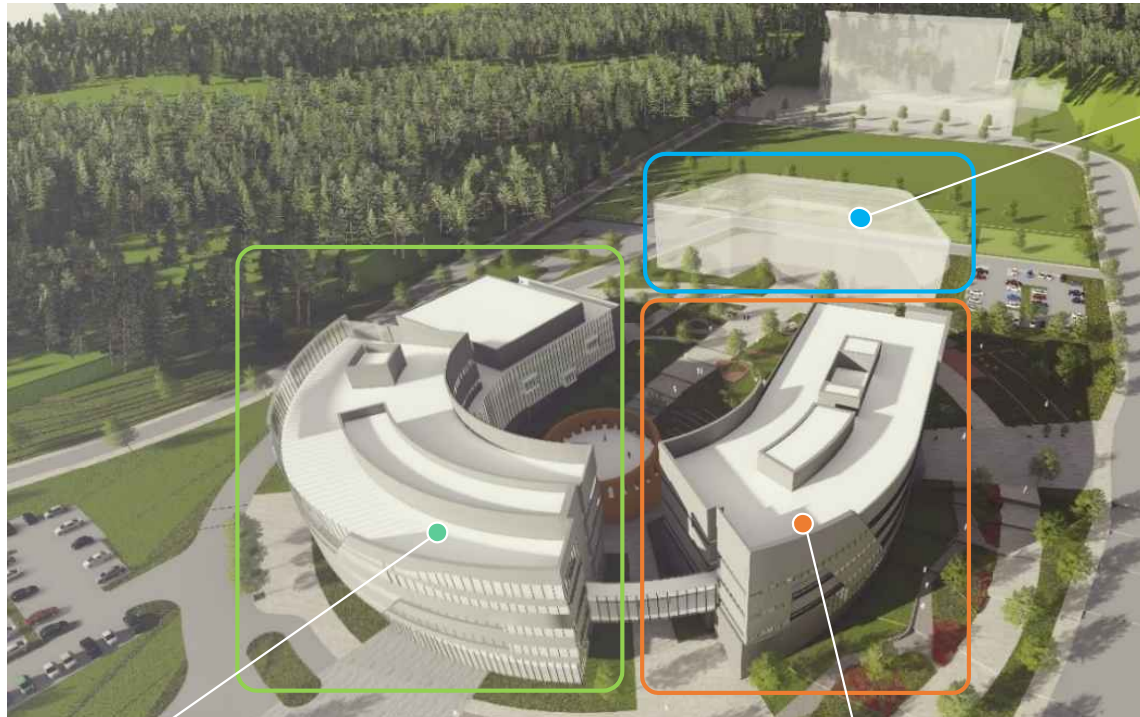
“Enactment of the Brain Research Promotion Act”

(Article 17, Establishment of Research Institute, by Korean National Assembly, July 1998)

Aims: To conduct, utilize, and support brain research and maintain and develop a close cooperative system among academia, research institutes, and industries.



KBRI Research buildings



Implementation Research (Step 3, Cooperation Bldg.)

- Cost : 18.9 billion won
- Area : 6,460m²
- Period : '19 ~ '23 (Completion, next year)



Step 3. Cooperation bldg.

Basic Research (Step 1, Left-hemisphere Bldg.)

- Cost : 88.9 billion won
- Area : 20,583m²
- Period : '11 ~ '14 (Completed)

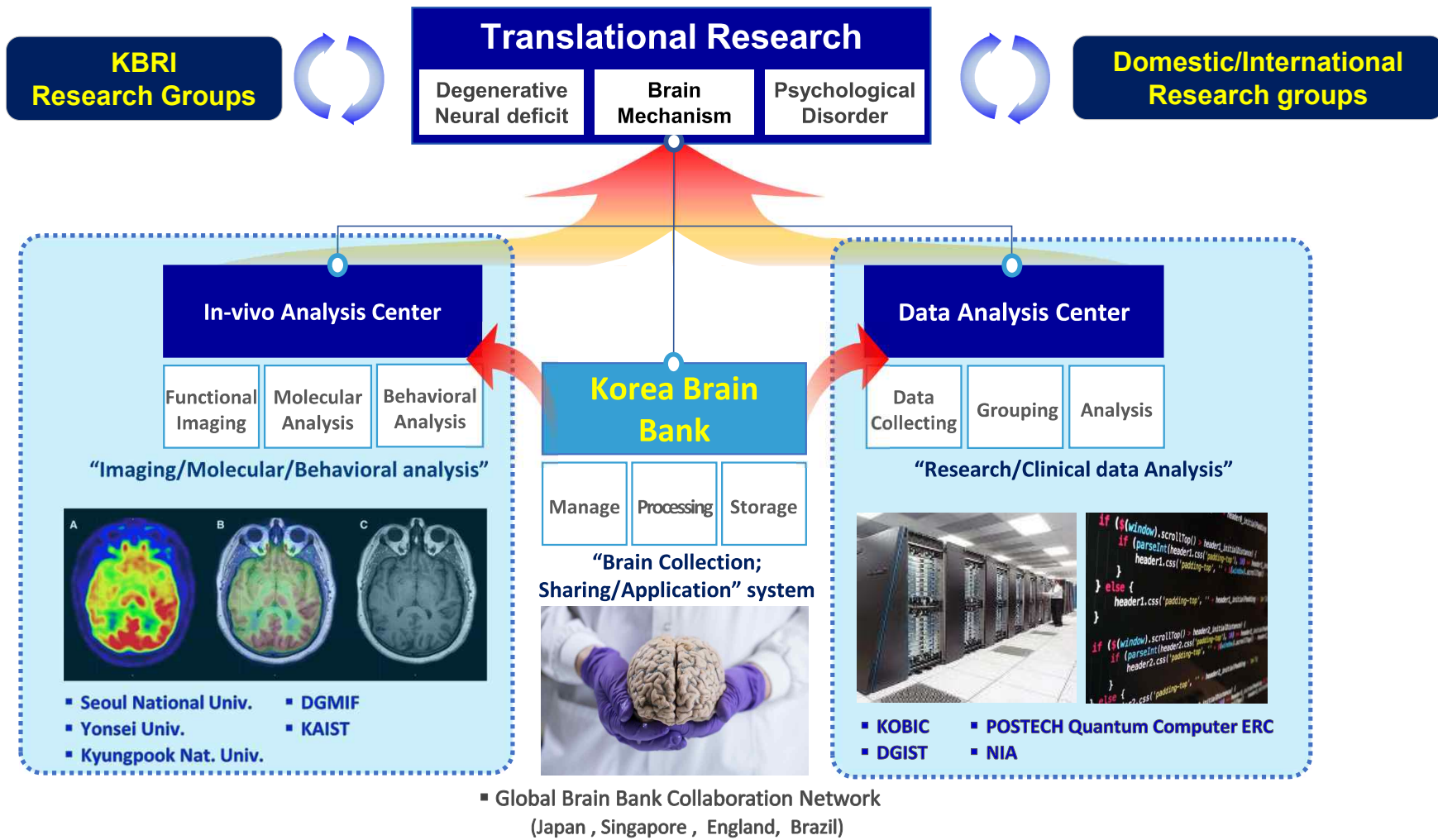
Applied Research (Step 2, Right-hemisphere Bldg.)

- Cost : 28.75 billion won
- Area : 11,065m²
- Period : '19 ~ '22 (completed, this year)

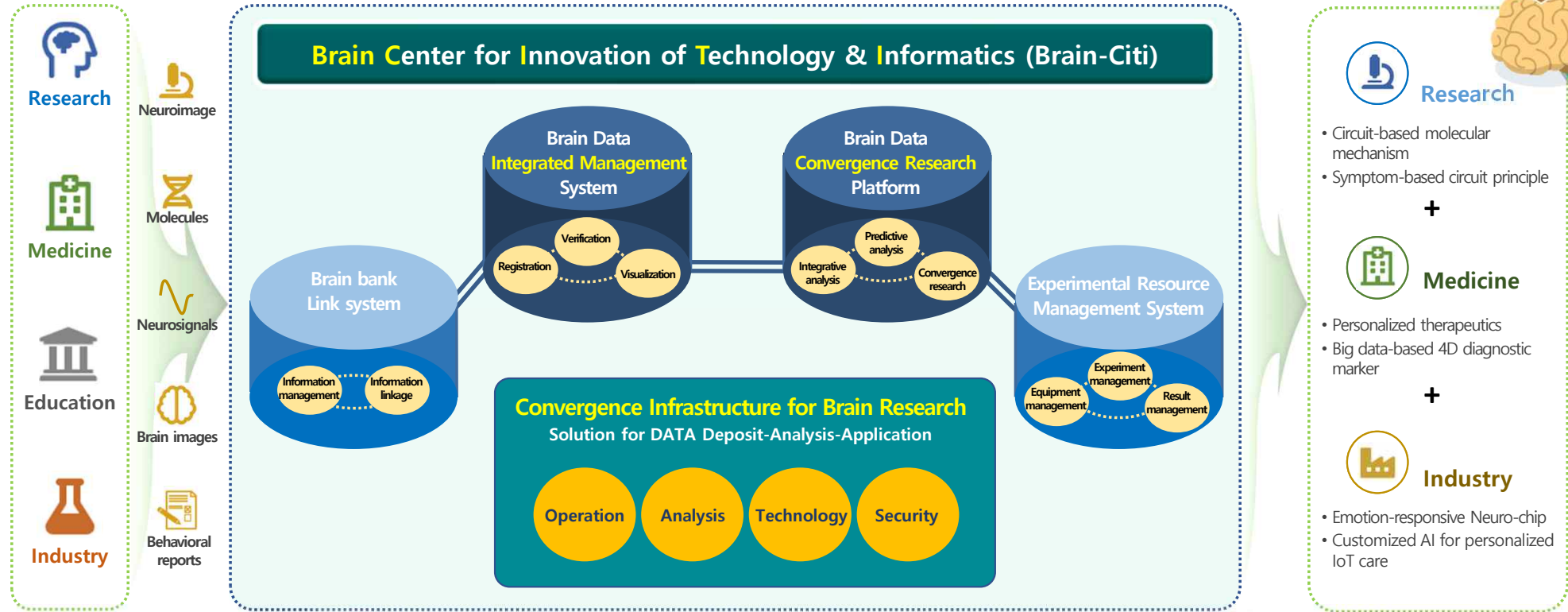


Step 2. Right hemisphere bldg.

Implementation research in KBRI



Database Development for National Brain Research Resources



Advanced Neuro-informatics System for Global Brain Research Collaboration

Data standardization in Brain Science

범부처 합동 생명연구자원 정책추진 온라인 보고대회

뇌과학 연구분야

- 추진방향
 - 뇌과학 분야 실험데이터를 타입별로 분류하였으며, 크게는 다음 세 종류임

대분류	중분류	소분류	참고 국제표준
분자정보	오믹스	Genomics Proteomics Transcriptomics Epigenomics Metabolomics Other	
	분자구조	Small molecules Peptides and proteins Larger assemblies	
영상정보	매크로 영상 (In-vivo)	MR/MBRI PET/SPECT CT/Ultrasound	BIDS / DICOM
	마이크로 영상 (Ex-vivo)	EEG, MEG, iEEG (ECoG) 광학이미징 전자현미경 Other	BIDS IDR (Image Data Resource) EMPIAR (Electron Microscopy Public Image Archive)
	영상기반 모델링 (Reconstruction data)	Brain mapping (Macro) Brain mapping (Micro)	Biolmage Archive NITRC DVID
기타	생체신호	신경활성 (Ca2+imaging) 전기신호	
	행동	현상 임상	Phenotype

각 실험데이터 타입별 국제 표준 조사를 기반으로 데이터 등록양식 마련

주관: 과학기술정보통신부, 농림축산식품부, 산업통상자원부, 보건복지부, 환경부, 해양수산부, 식품의약품안전처, 농촌진흥청

바이오 연구 데이터 표준 등록 양식

2020. 12.

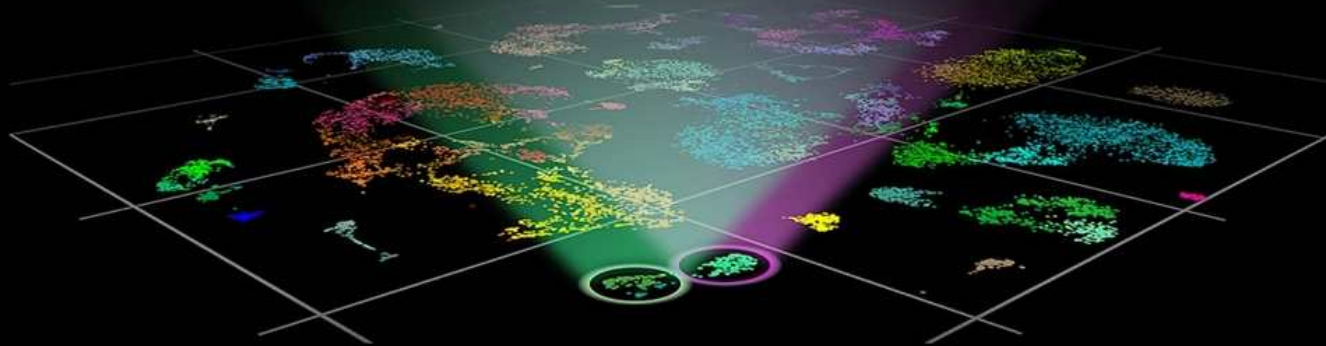
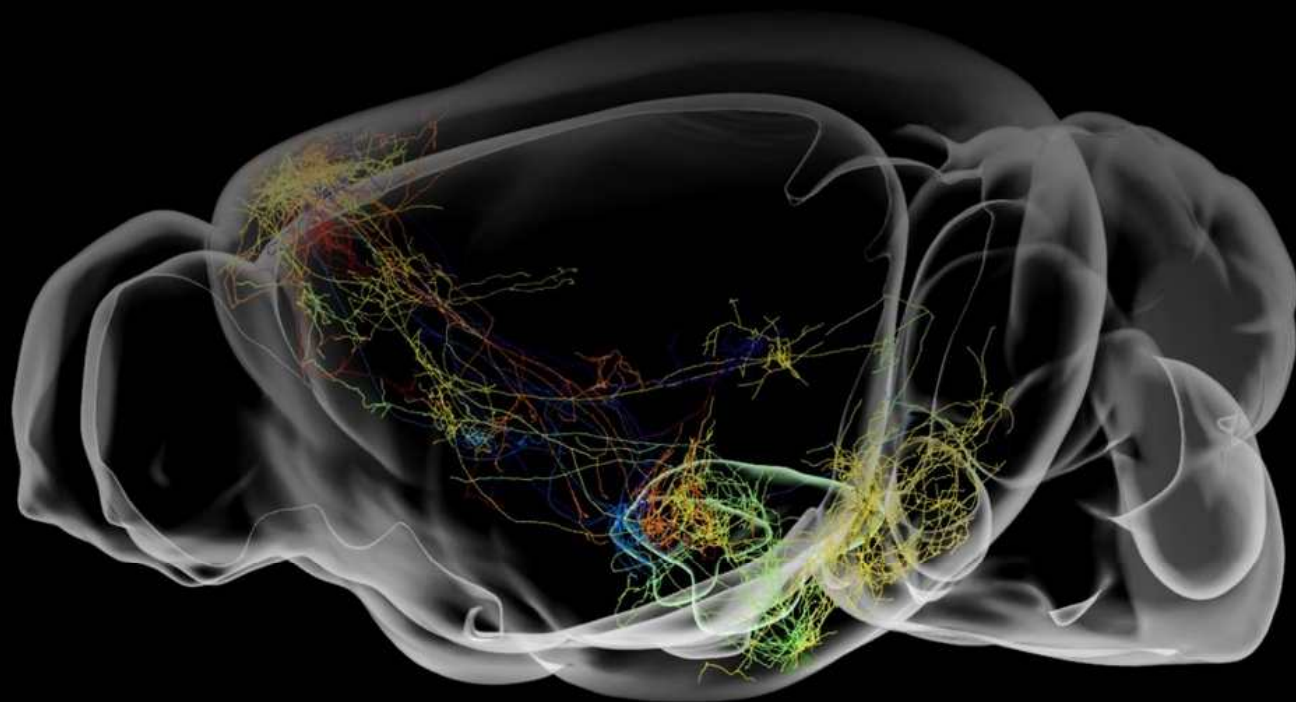
과학기술정보통신부, 농림축산식품부, 산업통상자원부, 보건복지부, 환경부, 해양수산부, 식품의약품안전처, 농촌진흥청, 질병관리청, 산림청

kobic 국가생물연구자원정보센터, CODA, NABIC

Data standardization in Brain Science

Main Category	Classification-ii	Classification-iii	Format	Link
Molecular Information	OMICS	Genomics Proteomics Transcriptomics Epigenomics Metabolomics		
		Other	Single Cell Portal Neuroscience Multi-omic Archive(NeMO)	https://singlecell.broadinstitute.org/single_cell https://nemoarchive.org/
	<u>Molecular Structure</u>	Small molecules	Crystallography Open Database (COD)	http://www.crystallography.net/cod/
		Peptides and proteins	Worldwide Protein Data Bank (wwPDB)	https://www.wwpdb.org/
		Larger assemblies	Electron Microscopy Data Bank (EMDB)	http://www.emdataresource.org/index.html
NeuroImaging	Macro(In-vivo)	MRI/fMRI	BIDS / DICOM	https://bids.neuroimaging.io/ https://www.dicomstandard.org/
		PET/SPECT CT/Ultrasound EEG, MEG, iEEG(EECoG)	BIDS	https://bids.neuroimaging.io/index.html
	Micro(ex-vivo) https://www.nature.com/articles/d41586-020-00594-4	Optical Imaging (Cell, Tissue)	IDR (Image Data Resource)	http://idr.openmicroscopy.org/tissue/
		Electron Microscopy (Molecules to cells)	EMPIAR (Electron Microscopy Public Image Archive)	https://www.ebi.ac.uk/pdbe/emdb/empiar/about
		Other	BioImage Archive	https://www.ebi.ac.uk/bioimage-archive/
	Modeling (Reconstruction data)	Brain mapping(Macro)	NITRC NIDM-Results	https://www.nitrc.org/projects/brainmap/ https://www.nature.com/articles/sdata2016102
		Brain mapping(Micro)	DVID	https://github.com/janelia-flyem/dvid
Etc	Biosignals	Ca2+ imaging	LFP, Endomicroscopy, Multi-photon	
		Electrophysiology	Single Unit, LFP, voltammetry, Ion channel	
	Behaviors	Pre-clinical		
Clinical				

Thanks~!



Korea Brain Research Institute

Vision

“Global Leading Institute in Brain Research”

“The First on the Best”

Mission

“Contribute to health and happiness of human through brain research”

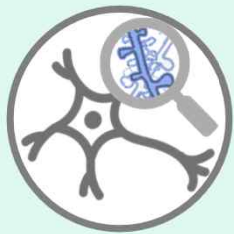


International collaborative Brain Research

– by Global Emotion & Addiction Project

Step1 'Aggregation' ['22-'23]

Multi-scale Emotion-Brain Mapping



Micro/Meso
Brain Map



Macro-Molecular
Brain Map

Psychiatric Brain Mapping

Step2 'Sophistication' ['24-'25]

Refining Brain Maps by integrative analysis



Step3 'Application' ['26-'27]

Big-data based Mental Health Strategy



Structure-Function
Big data



Neuromodulatory
Resource Technology

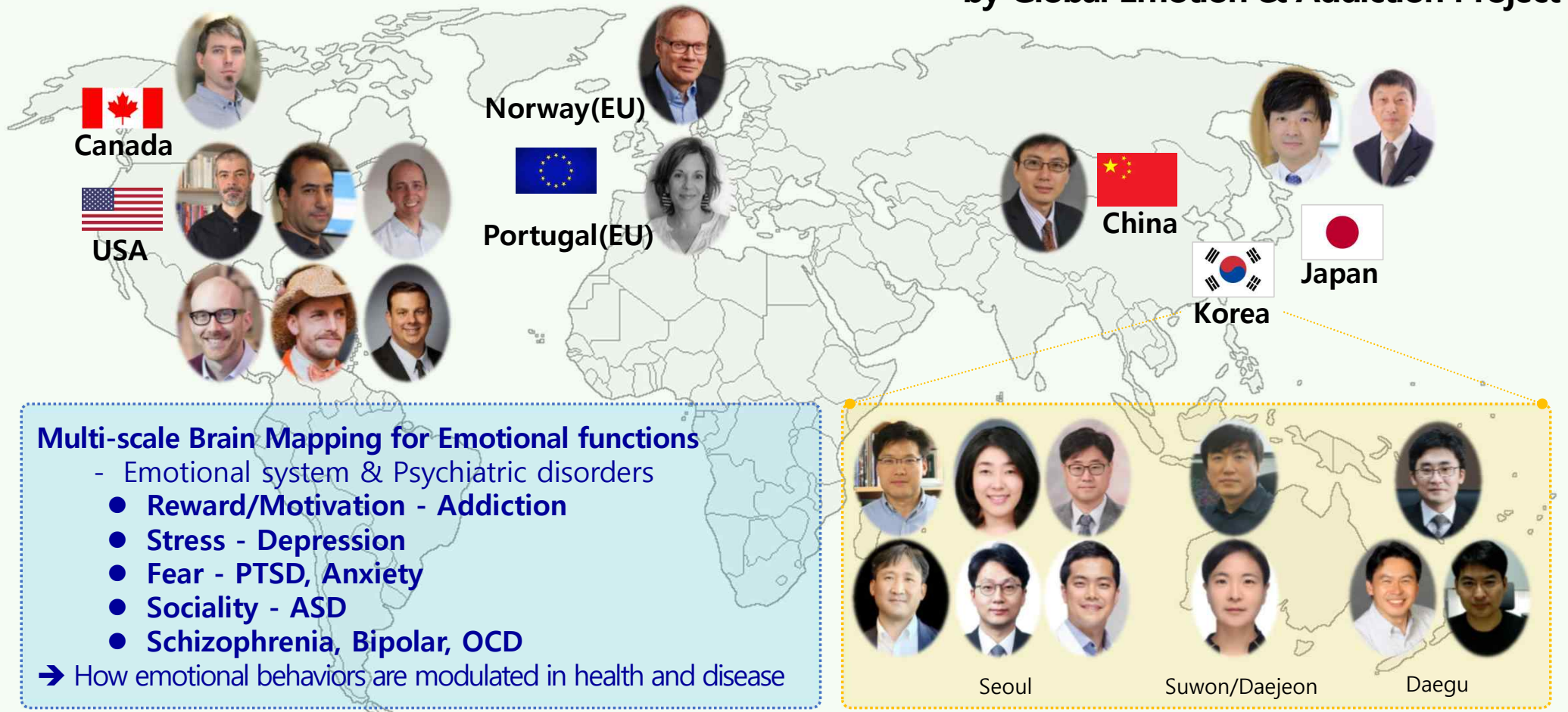
Psychiatric marker identification
& Neuromodulation



Multi-scale Circuit/Molecule Brain Mapping for Mental Health Strategy

International collaborative Brain Research

– by Global Emotion & Addiction Project



Multi-scale Brain Mapping for Emotional functions

- Emotional system & Psychiatric disorders

- Reward/Motivation - Addiction
- Stress - Depression
- Fear - PTSD, Anxiety
- Sociality - ASD
- Schizophrenia, Bipolar, OCD

→ How emotional behaviors are modulated in health and disease

IBI Daegu Conference 2022 – by Global emotion & addiction project



International Brain Initiative Daegu Conference 2022

Sept. 21(Wed)-23(Fri), 2022
KBRI, Daegu, Korea

Emotional Brain Mapping in Health & Disease

Invitation

It is our great pleasure to welcome you to the 1st IBI Daegu Conference 2022, scheduled for September 21-23, 2022 at the Korean Brain Research Institute (KBRI) in Daegu, South Korea. Our conference, of which theme is 'Emotional Brain Mapping in Health & Disease', aims to bring global scientists together in order to catalyze and advance neuroscience research through international collaboration and knowledge sharing.

This year, we will have 2 plenary lecturers: Linda J. Richards, who is a founding member and spokesperson for the International Brain Initiative (Washington University at St. Louis) and Alan P. Jasanoff (Massachusetts Institute of Technology). There will be 5 symposia and 2 poster sessions where we will discuss how emotional behaviors are modulated in health and disease, updating state-of-the-art headways and new concepts in the field of neuroscience

I look forward to seeing you all in Daegu and making this meeting a scientific summit and a memorable festivity with you.

Sincerely,
Pann-Ghill Suh, KBRI President

Schedule

Day 1 (Sept. 21, 2022)

~ 14:00 Registration
14:00 ~ 14:10 Welcome Address **Pann-Ghill Suh** (KBRI)
14:10 ~ 14:50 Opening Lecture **Ja Wook Koo** (KBRI)
14:50 ~ 15:00 Break
15:00 ~ 17:00 Symposium 1 **Schizophrenia**
17:00 ~ 18:00 Poster presentation (A)

Day 2 (Sept. 22, 2022)

09:30 ~ 10:20 Plenary Lecture **Linda J. Richards** (Washington University)
10:20 ~ 10:30 Break
10:30 ~ 12:30 Symposium 2 **Stress/Depression (1)**
12:30 ~ 14:00 Lunch / Poster presentation (B)
14:00 ~ 16:00 Symposium 3 **Stress/Depression (2)**
16:00 ~ 16:10 Break
16:10 ~ 18:15 Symposium 4 **FEAR/PTSD**
18:30 ~ 20:00 Banquet

Day 3 (Sept. 23, 2022)

09:30 ~ 10:20 Plenary Lecture **Alan P. Jasanoff** (MIT)
10:20 ~ 10:30 Break
10:30 ~ 12:30 Symposium 5 **Brain mapping**
12:30 ~ 13:00 Closing Ceremony
13:00 ~ Social Networking

[Topic]

1. Reward - Addiction
2. Stress - Depression
3. Fear - PTSD, Anxiety
4. Schizophrenia
5. Neuro-engineering

IBI Daegu Conference 2022 – by Global emotion & addiction project at KBRI

International Brain Initiative Daegu Conference 2022
September 21(Wed)-23(Fri), 2022
KBRI, Daegu, Korea

Emotional Brain Mapping in Health & Disease

Plenary Speakers

- Linda J. Richards
Washington University
- Alan P. Jasanoff
MIT

Symposium Speakers

- Matthew J. Girgenti
Yale University
- Yong Kim
Rutgers University
- Amar Sahay
MGH
- Peng Cao
National Institute of Biological Sciences, Beijing
- Sung Han
Clayton Foundation Lab for Psychobiology
- Tiago Branco
University College London

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- 12:30 – 13:00 Break
- 13:00 – 18:00 Lunch/Gyeongju Tour



Linda J. Richards, PhD

- Edison Professor and Chair, Department of Neuroscience, Washington University
- Director, McDonnell Center for Cellular & Molecular Neurobiology, Washington University



Alan P. Jasanoff, PhD

- Professor, Departments of Biological Engineering, Brain and Cognitive Sciences, Nuclear Science and Engineering, MIT McGovern Institute
- Director, Center for Neurobiological Engineering, MIT McGovern Institute



Matt Girgenti, PhD

- Assistant Professor, Division of Molecular Psychiatry, Yale University
- Deputy Director for Research, VA National PTSD Brain Bank



Yong Kim, PhD

- Associate Professor, Department of Neurosurgery, Rutgers University
- Core Member, Brain Health Institute, Rutgers University



Amar Sahay, PhD

- Associate Professor, Department of Psychiatry, Center for Regenerative Medicine at MGH
- Associate Member of the Broad Institute of MIT and Harvard



Peng Cao, PhD

- Principal Investigator, National Institute of Biological Sciences at Beijing



Sung Han, PhD

- Assistant Professor, Clayton Foundation Laboratories for Peptide Biology, Salk Institute



Tiago Branco, MD, PhD

- Professor, Sainsbury Wellcome Centre for Neural Circuits and Behaviour, University College London