

GCCW

Global Commercialization Strategies for Advanced Biotechnology

International Research Collaboration as KAIST NCC

Byunghwa Hyun, KAIST GCC



KAIST GCC is established in 2015.

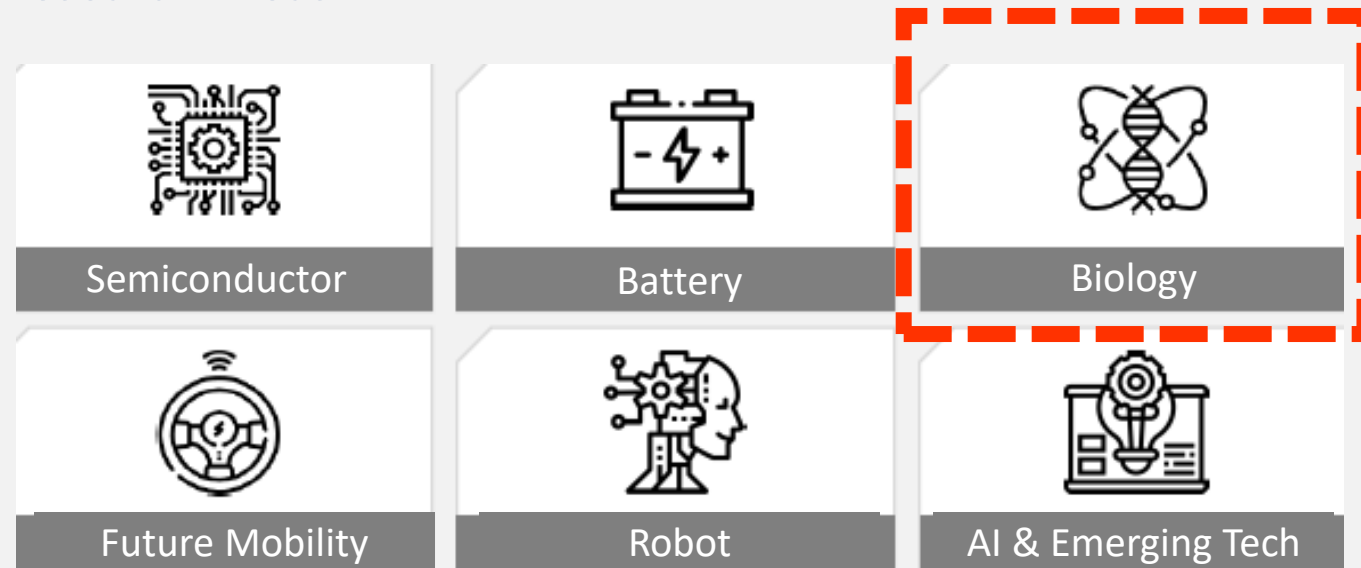
The main goal is to vitalize outcomes of R&D into business opportunities, bridging Korea and Partner Countries



* NCC (National Collaboration Center), GITCC (Global Industrial Technology Collaboration Center)

Summary of the Project

➤ Research Areas



➤ Total Budget for the Project: 57,000,000,000 Won (40 Million Euro/24')

- Budget for 1 project: 2,000,000,000 Won (1.4 Million Euro)/1 year
- Duration of Research: 3 Year(Basic) + 2 Year(Optional)
- Budget for International Partners ≥ 40% of total budget for 1 project

➤ Institutional selection

- March ~ April 2024

➤ Organization of Consortium

- Korean company should be a major institution of the project
- International and domestic partners can join as a participating party
- International research institute, academy, or industry can join
- Participation of international partner is mandatory

Type	Cooperation Center		Joint R&D	
Major Institution	KIAT (Agency vested with exclusive responsibility for GITCC as well)		Consortium select	Domestic companies * Domestic non-profit organizations can act on behalf of domestic companies, after securing demand from domestic companies
Participating Institution	NCC			[Overseas participating institution (required)] Overseas academia, research institutes and corporations * Organizations other than the Center are also eligible for participation
	Designate or Select	Overseas research institutes, universities, etc.		[Domestic participating institute (option)] Domestic and overseas academia, research institutes and corporations
Eligible Fields	Cutting-edge industries (Semiconductors, batteries, bio, future mobility, robots, displays, AI and emerging promising industries)			

Summary of the Project

Recommended Research Topics for Global R&D

1

When it is not possible to develop certain technology in Korea within a specified time frame **three years**

일정기간 (3년 이내)
국내 개발이 불가능



2

When the key original technology (IP) has already been secured by a foreign country's entity

해외가 핵심 원천기술(IP)을
이미 선점한 경우



3

When international cooperation has the potential to significantly reduce the development period (by more than one year) **and costs** (by more than 50%).

해외협력으로 개발기간(1년 이상) 및
비용(50% 이상)의 대폭 단축이 가능



4

When global certification, demonstration, and the attainment of global standards are essential for penetrating and developing new markets

신시장 개척을 위해 해외 인증, 실증 및
글로벌 표준확보가 필수적인 과제



5

When international cooperation is required to address global challenges, such as climate change

기후변화 등 글로벌 난제 해결을 위해
국제 공조가 필요한 분야



글로벌산업기술협력센터 NCC



글로벌산업기술협력센터 (GITCC)

예일대학교



퍼듀대학교



존스홉킨스대학교



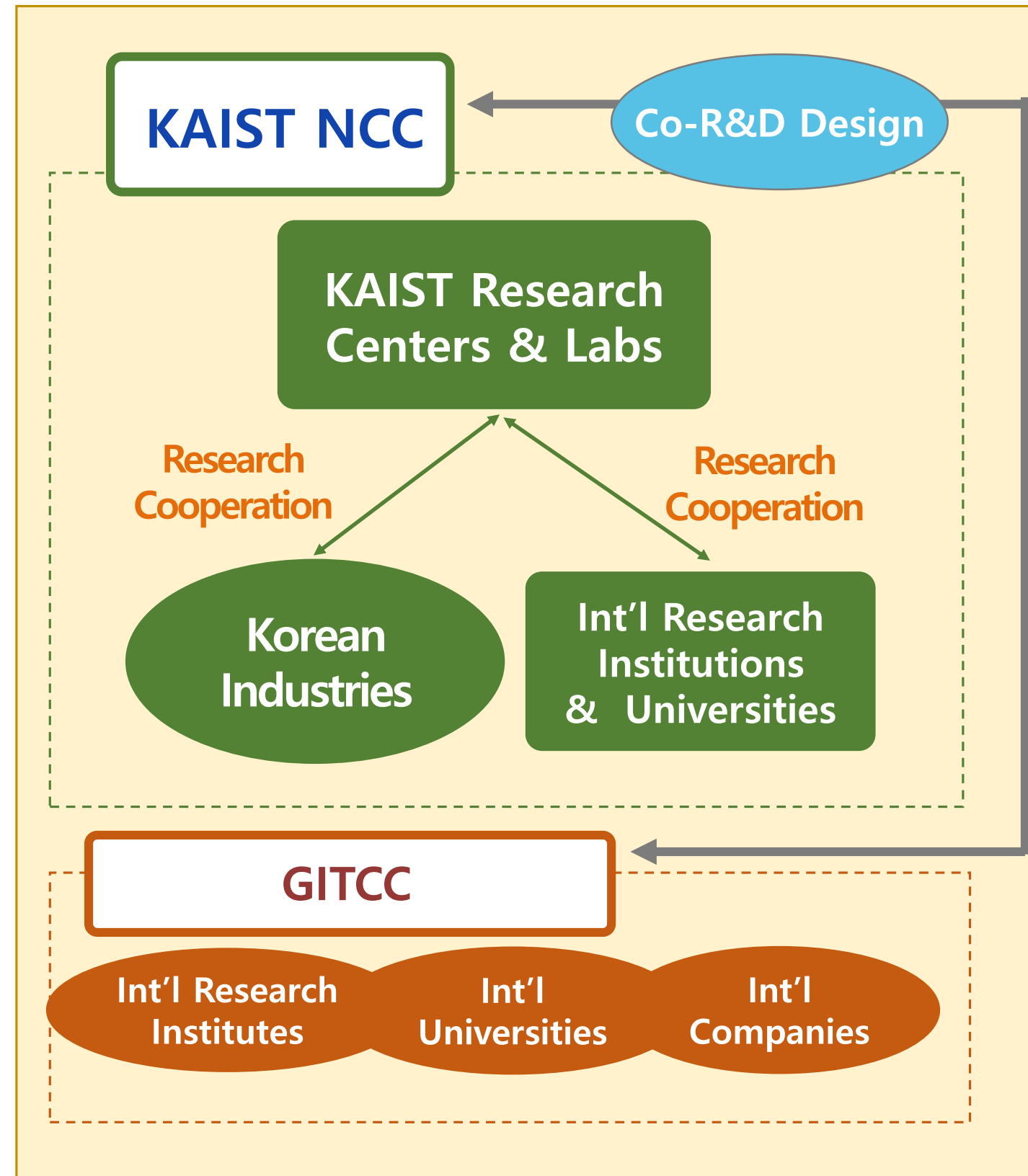
조지아 공대



MIT



프라운호퍼



Selected Research Projects Involving KAIST for 2024

Lead Research Institution	Collaborative Research Institution	Project title
크리모 KREEMO	Aura Intelligent Systems, MIT, KAIST	주파수, 표준, 기상 변화에 영향 없는 무결성 소프트웨어 기반 PHY 내장 초광대역 모빌리티 송수신 솔루션
한국자동차연구원 KATECH	FEV Europe GmbH, Michigan Technological University, 에이치디현대인프라코어(주), KAIST	탄소중립 및 CO2 규제 대응 세계최고수준 Heavy Duty용 11L급 직분식 수소엔진 기술개발
(주)뉴로메카 Neuromeka	Georgia Inst. Tech, ETRI, KAIST	거대 인공지능 모델을 활용한 양방향 맞춤형 인간-로봇 상호작용, 의미론적 자율주행 및 양팔 복합 조작기능을 갖춘 의료보조용 휴머노이드 모바일 로봇의 상용화 기술개발
나노인텍(주) NANOINTECH	Fraunhofer IKTS, Fraunhofer IPT, Fraunhofer IWS, (주)코보시스, KETI, KAIST	스마트 배터리 파운드리 산업 4.0 구현 위한 디지털 공정 기반 친환경 건식 전극용 토탈 솔루션 개발
한국과학기술원 KAIST	(주)토모큐브, Columbia University Irving Medical Center, Mayo Clinic, KAIST	심도 강화 홀로토모그래피와 인공지능을 이용한 3차원 조직병리학 플랫폼 개발
(주)인게니움테라퓨틱스 Ingenium Therapeutics	Yale University, KAIST	체내 리프로그래밍을 이용한 in vivo CAR-NK 세포치료제 제작 및 타겟팅 검증을 통한 난치성 고형암 치료용 후보물질 개발

Targeted in vivo engineering of CAR-NK cells for next-generation cancer immunotherapy



Ingenium Therapeutics (IT) Work Package 1

Joint R&D at Cooperation Center/Researcher dispatched from IT Work Package 3

Yale University (YU) Work Package 2

1st yr

2024.8.1
~2024.12.31

Task 1. Generation of CAR mRNA
1.1 monoclonal Ab for tumor antigens
1.2 CAR mRNA construction
(ScFv-TM- 41BB-DAP10-CD3-IL-15)
1.3 ex vivo CAR-NK generation

Task 2. Generation of H/M Ab-NP-complex
2.1 monoclonal Ab against mouse/human NK cells
(e.g. NK1..1, DX5, CD56, NKp46 etc)
2.2 NP
2.3 conjugation of mouse/human NK Ab to NP

2nd yr

2025.1.1
~2025.12.31

Task 3. Efficacy of ex vivo mRNA-base CAR-NK cells
3.1 in vitro anti-tumor activity of ex vivo CAR-NK
3.2 in vivo anti-tumor activity of ex vivo CAR-NK

Task 6. in vitro efficacy of H/M Ab-NP-mRNA
4.1 in vitro targeting of Ab-NP-mRNA into NK cells
4.2 in vitro cytotoxicity of Ab-NP-mRNA complex

Task 4. Generation of H/M Ab-NP-CAR mRNA complex
4.1 CAR mRNA (from IT)
4.2 Ab-NP complex
4.3 encapsulation of CAR mRNA into Ab-NP complex
4.4 scale-up of Ab-NP-CAR mRNA complex

3rd yr

2026.1.1
~2026.12.31

Task 5. Production of monoclonal antibody against human NK cells (KBIO, etc)
8.1 Ab against NKp46 Ab, etc
8.2 purification and characterization of Ab

Task 7. in vivo Targeting of M Ab-NP-mRNA
6.1 in vivo targeting of Ab-NP-mRNA into NK cells
6.2 in vivo distribution of Ab-NP-mRNA complex

Task 9. Generation of human Ab-NP-CAR mRNA-complex
9.1 human Ab (from IT)
9.2 Ab-NP-CAR mRNA complex

4th yr

2027.1.1.
~2027.7.31

Task 8. in vivo efficacy of M Ab-NP-mRNA
7.1 solid cancer tumor models (e.g. lung cancer, liver cancer, etc)
7.2 in vivo anti-tumor efficacy of Ab-NP-mRNA complex
7.3 in vivo kinetics of Ab-NP-mRNA complex

Task 10. Humanized mouse tumor model
9.1 NSG-Tg(Fu-IL15)
9.2 Transplantation of human PBMC
9.3 Transplantation of human tumor

Task 12. Global commercialization

4~5th yr

2027.8.1
~2029.7.31

Task 11. in vitro & in vivo efficacy of Ab-NP-mRNA in humanized mouse
5.1 in vitro targeting of Ab-NP-mRNA into NK cells
5.2 in vivo targeting of Ab-NP-mRNA into NK cells
5.3 in vivo anti-tumor efficacy of Ab-NP-mRNA complex



W. Mark Saltzman, Ph.D



The 17th Global Commercialization Conference and Workshop

2024. 11. 5 Tue - 11. 6 Wed
 KAIST Main Campus, KI Building(E4), 1F
 Nam Pyo Suh FUSION HALL

HOSTED BY: Ministry of Science and ICT, Ministry of Trade, Industry and Energy, Ministry of SMEs and Startups

ORGANIZED BY: KAIST

SPONSORED BY: KAIST, KIAT, KEIT, STP, KISED, KPBM, CAID

Session	Global Commercialization Strategies for Advanced Biotechnology		
Time	Title	Speaker (Position)	Affiliation
09:30~09:35 (5')	Opening Address	Mun-kee Choi (Director)	KAIST GCC
09:35~09:40 (5')	International Research Collaboration as KAIST NCC	Byung-Hwa Hyun (Principal researcher)	KAIST GCC
09:40~09:50 (10')	KIAT Global Industrial Technology Cooperation Center	Jaehong Kim (Professor)	Yale University GITCC
09:50~10:00 (10')	Ongoing Research Collaboration at Georgia Tech and International Partnership with Korea	W. Hong Yeo (Harris Saunders Jr. Professor)	Georgia Institute of Technology GITCC
10:00~10:10 (10')	Johns Hopkins Global Biotechnology Innovation Center (JBIC)	Deok-Ho Kim (Professor)	Johns Hopkins University GITCC
10:10~10:40 (30')	(Keynote Speech) K-BIO, Move to the World Market	Yoonjong Cun (Chairman and President)	Korea Planning & Evaluation Institute of Industrial Technology
10:40~11:00 (20')	Holotomography and Artificial intelligence for 3D histopathology	YongKeun Park (CEO)	Tomocube
11:00~12:00 (60')	(Panel Discussion) The Collaboration between NCC and GITCC in Life Sciences	Yooduk Jun (Moderator) Executive Director, International Cooperation Center, Korea Institute for Advancement of Technology	Kwang Rok Kim, Director, Therapeutics & Biotechnology Division, Korea Research Institute of Chemical Technology Deok-Ho Kim, Professor, Johns Hopkins University GITCC Jaehong Kim, Professor, Yale University GITCC Hyung-Chul Kim, Biotechnology PD, Korea Planning & Evaluation Institute of Industrial Technology W. Hong Yeo, Harris Saunders, Jr. Professor, Georgia Institute of Technology GITCC Byung-Hwa Hyun, Principal Researcher, KAIST Global Commercialization Center