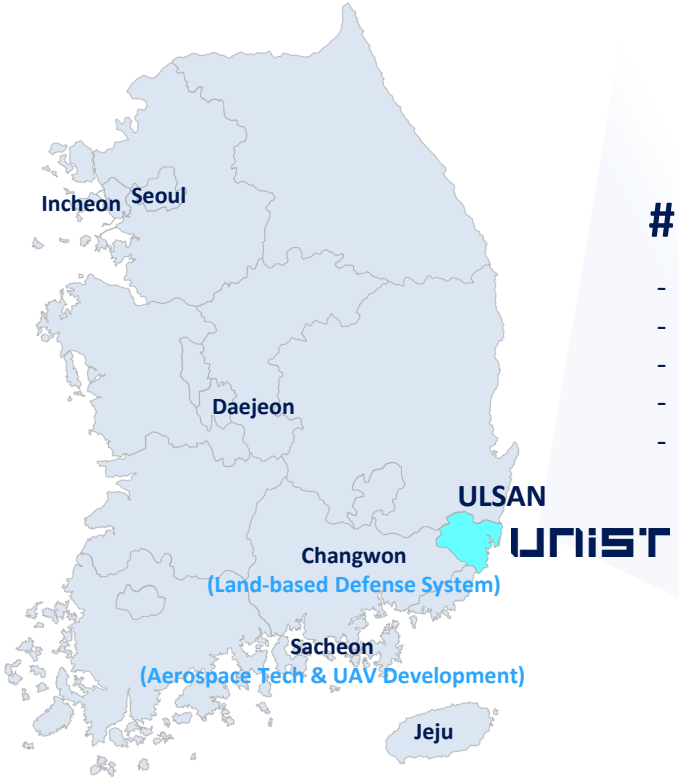

UNIST
We're Pioneers!
"Bridging the World
Through Science and Technology"
UNIST

ULSAN: “Industrial Capital City”



#1 in Korea

- Automotive
- Shipbuilding
- Petrochemical
- Non-ferrous Metal
- Secondary Battery

ULSAN is The Home of

HYUNDAI

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

SK innovation

SAMSUNG SDI

S-OIL

LS-Nikko 동제련

+ 7,000 SMEs

What Makes UNIST Unique?

Four Major Institutes of Science & Technology.

UNIST	KAIST	GIST	DGIST
2007	1971	1995	2004

“Government Support and Autonomy”

- 100% English-Based Curriculum
- Interdisciplinary Education
- The Average age of UNIST Faculty is 45 years old
- Strategic Location within the Ulsan Industrial Hub

Academic Organization

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19 Departments in 3 Colleges

College of Engineering

- Mechanical Eng.
- Urban & Environ. Eng.
- Materials Sci. and Eng.
- Energy & Chemical Eng.
- Nuclear Eng.
- Semiconductor Eng.

Graduate School

- Semicon. Mat. & Devices Eng.
- Carbon Neutrality

College of Info. & Biotech

- Design
- Biomedical Eng.
- Industrial Eng.
- Biological Sci.
- Electrical Eng.
- Computer Eng.

Graduate School

- Artificial Intelligence
- Health Sci. & Tech.

College of Natural Sciences

- Physics
- Mathematical Sci.
- Chemistry

3 Special Graduate Schools
2 Schools

Special Graduate Schools

- Tech. & Innovation Management
- Interdisciplinary Management
- Novatus Graduate School

Schools

- Business Administration
- Liberal Arts
- New UNISTars

Personnel Overview

Faculty	Students	Graduates	Staffs
340	4,774	9,409	417

International Personnel

Faculty	Researchers	Students
44	49	279

Research Impact

THE WORLD UNIVERSITY RANKINGS

2 World #15

2024 Young Univ.

2 World #4

2024 Small Uinv.

6 World #199

2024 World Univ.

QS WORLD UNIVERSITY RANKINGS

3 World #34

Citation per Faculty

CWTS Leiden Ranking
Meaningful metrics

1 World #178

(Top 10% Publications)

Research Impact

“48”

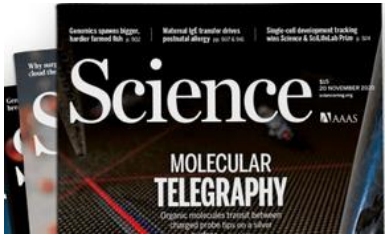
Lead author: 32

33.5 (**2nd** in the nation)

Average citations per paper over the past 10 years

28

(Lead author: 19)



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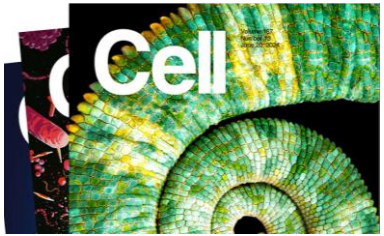
(Lead author: 12)



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(Lead author: 1)

Research Impact

7

World's Top 1% Influential Researchers

(Highly Cited Researchers (HCRs))
YR 2024

Clarivate™

2024 Highly Cited Researcher

Materials Science

Rodney S. Ruoff

Sang Il Seok

Interdisciplinary Field

Kwang Soo Kim

Hyun-Wook Lee

Seung Woo Cho

Changduk Yang

Hu Young Jeong

#	Name	Field	# of years selected	Departments
1	Rodney S. Ruoff	Material Sci	11 consecutive years	Chemistry
2	Kwang Soo Kim	Interdisciplinary	7 consecutive years	Chemistry
3	Sang Il Seok	Material Sci	7 consecutive years	Energy and Chemical Engineering
4	Hyun-Wook Lee	Interdisciplinary	6 consecutive years	Energy and Chemical Engineering
5	Seung Woo Cho	Interdisciplinary	4 consecutive years	Biomedical Engineering
6	Changduk Yang	Interdisciplinary	3 consecutive years	Energy and Chemical Engineering
7	Hu Young Jeong	Interdisciplinary	3 consecutive years	Semiconductor Materials & Dev. Eng.

3 On-Campus Research Centers

"Secured 300 Billion KRW in Research Grants for up to 10 Years"

Center for Soft and Living Matter

Bartosz A. Grzybowski

Dept. of Chemistry

Center for Multidimensional Carbon Materials

Rodney S. Ruoff

Dept. of Chemistry

Center for Genomic Integrity

Kyungjae Myung

Dept. of Biomedical Eng.

Research Thrusts

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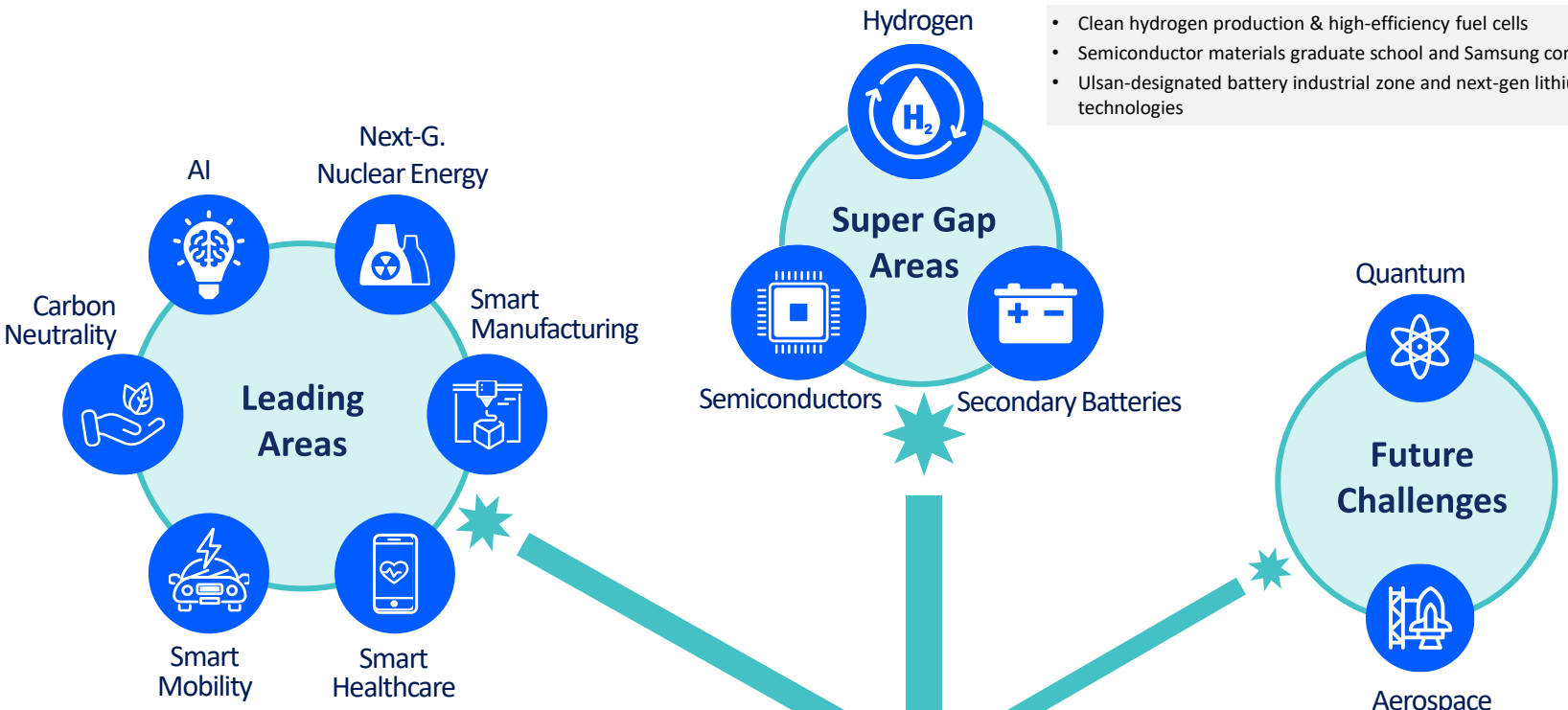
UNIST Research Focus Area



- Clean hydrogen production & high-efficiency fuel cells
- Semiconductor materials graduate school and Samsung contract program
- Ulsan-designated battery industrial zone and next-gen lithium-ion technologies

- Global AI ecosystem and collaboration with 76 global institutions
- Novatus AI Academia initiative
- CO_2 capture, utilization, and storage (CCUS)
- Data-driven biomedical research and industrial safety specialization

- Equipped with in-house quantum chip fabrication infrastructure (Quantum Fab)

Key Research Area

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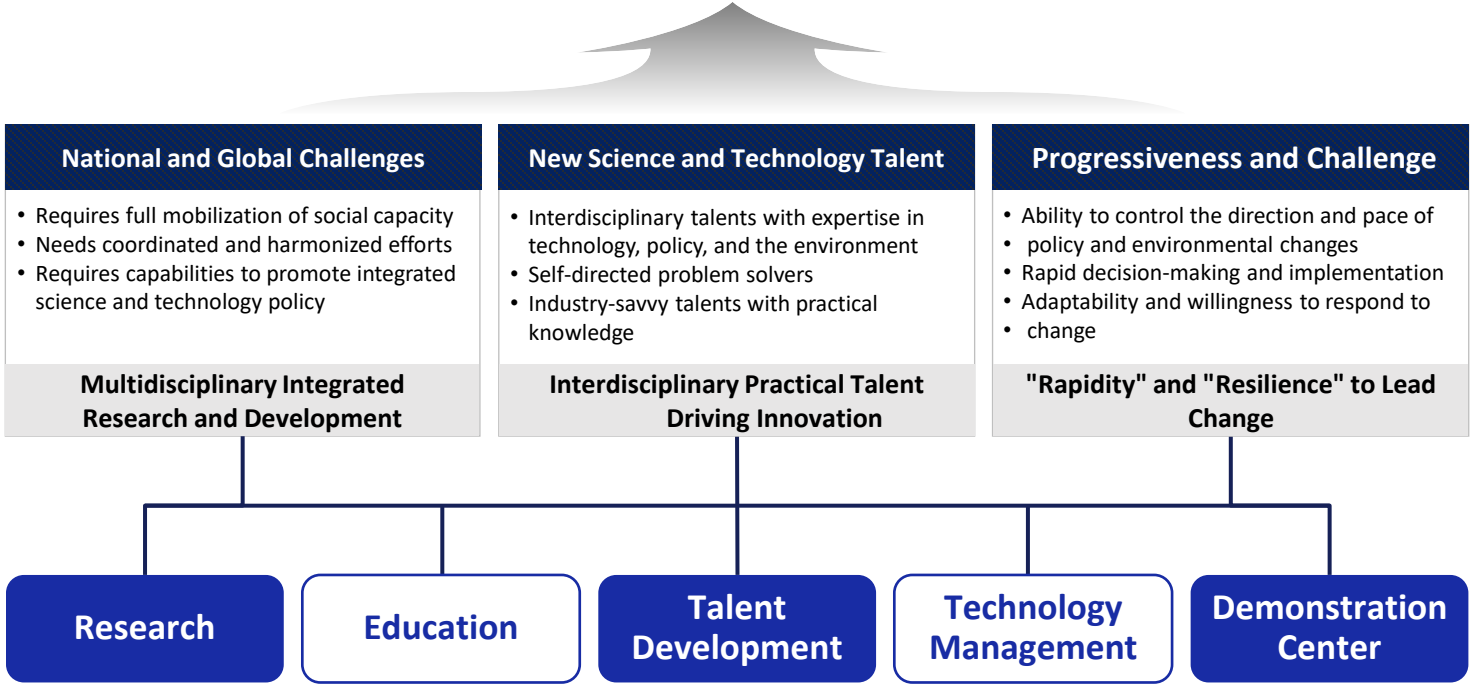
Carbon Neutrality

Realizing Carbon Neutrality by 2050



Key Research Area

UNIST We're Pioneers!

Carbon Neutrality

CCUS

Carbon Capture, Utilization, and Storage (CCUS)

Large-scale CO_2 Treatment Technologies and Biodegradable & Circular Plastic Solutions

Hydrogen

Clean Hydrogen and Ammonia Production, Utilization, Transportation, and Storage Technologies

Mass Production of Green/Blue Hydrogen and Advanced Ammonia Synthesis Technologies

Renewable Energy

Renewable Energy Technologies Including Solar Cells

Achieving World's Highest Efficiency and Large-area Scalability

Environmental Policy, Technology, Management

ESG-Based Environmental Policy, Technology, and Management

Carbon Cycle, International Regulatory Policies, and the New Climate Regime and Economic Order

Development of Carbon Neutrality Management Technology Based on Energy, Digital Twin, and AI for Achieving Carbon Neutrality

Advanced Research on Carbon Monitoring and Carbon Neutrality Planning Technologies

- Develop carbon monitoring and reduction policies using digital twin, AI, and emerging technologies
- Demonstrate and develop carbon neutrality technologies and policies

Establishment of a Secondary Battery Lifecycle System

- Research and scale up sustainable secondary battery materials
- Develop and evaluate material recovery processes
- Demonstrate and verify mass production technologies

Development of Self-sufficient Solar Energy Hub

- Develop biomass pretreatment catalysts and improve feedstock selection
- Optimize self-sufficient biomass–solar hybrid systems
- Explore urban carbon-neutral demonstration model

1. **Establish academic-industrial cooperation hubs linked with regional and national strategic industries**
2. **Expand and enhance role across sectors to secure national strategic core technologies**
3. **Strengthen the system to foster innovation-driven carbon neutrality R&D initiatives**

Key Research Area

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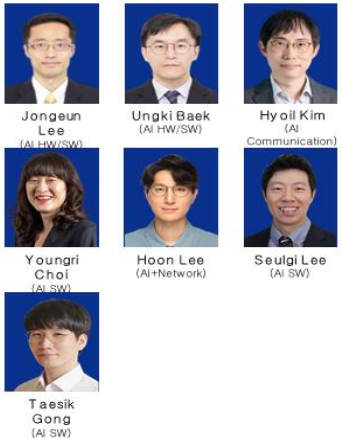
Artificial Intelligence

AI System

Memory-, Network-, and Software-based

Computer systems, networks, embedded and on-device computing, heterogeneous architectures, SoC (System-on-Chip) design, and cloud systems



AI Core

Based on machine learning, AI theory, and algorithms

Machine learning, natural language processing (NLP), robotics, computer vision, and 3D image processing

AI + X

AI-powered, interdisciplinary technologies

Autonomous driving, manufacturing, 3D printing, advanced materials, cybersecurity, healthcare, smart services, transportation and logistics, astronomy, environmental science, earth systems, disaster management, finance, semiconductors, and design

Key Research Area

UNIST We're Pioneers!

Artificial Intelligence

- **Management** — Development of dynamic resource management systems for deep learning systems
- **System** — Development of AI software and hardware acceleration systems for autonomous driving
- **Communication** — Development of AI-based next-generation intelligent communication systems
- **Embedded** — Efficient AI technologies for on-device and edge devices
- **Finance** — Development of AI-based asset management models in investment
- **Science** — AI-assisted development of new materials and celestial body research
- **Global Issues** — Climate research through AI
- **3D Vision** — Development of next-generation 3D visual intelligence technologies
- **Robotics** — Development of next-generation intelligent robotic (agent) technologies
- **Healthcare** — AI signal processing for robust, generalizable biosignals
- **Mobility** — Development of next-generation transportation AI technologies
- **Manufacture** — Development of AI-based optimized manufacturing technologies
- **Security** — AI-based software verification for safer personal data protection
- **NLP** — Development of next-generation multimodal interactive dialogue model technologies

Key Research Area

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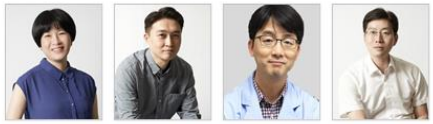
Advanced Bio

Biomedical Imaging

Sungchul Bae | Hyungjun Cho | Unggyu Jung | Hajin Kim | Junghoon Park | Joonmo Yang

Precision Medicine



Yoonkyung Cho | Juhun Kang | Chanyoung Park | Jongnam Park

Neurocognitive Engineering

Dongil Jung | Youngshin Kwak | Sungpil Kim | Osang Kwon | Youngbin Choi

Rehabilitation and Regenerative Engineering

Chanyoung Park | Jungbeom Kim | Taeun Park | Kwansub Shin | Youngbin Choi

Genome

Jonghwa Park | Seungwoo Cho | Taejoon Kwon | Semin Lee | Kyeongjae Myung

Graduate School of Medicine

Dooyoung Jung | Gyemyeong Park | Minhyuk Lim

Key Research Area

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Advanced Bio

AS-IS		TO-BE
Lack of workforce for elderly support	Build efficient and sustainable care robot systems →	• **Develop AI technologies for care services** • **Develop autonomous robot technologies to support physical, emotional, and daily needs**
Lack of understanding of aging markers/processes	Develop in silico aging simulation models →	• **Model aging processes using bio-big data** • **Develop in silico aging analysis platforms**
Insufficient lifespan evaluation systems |	Connect animal and in silico aging models for efficient lifespan evaluation →	• **Develop lifespan evaluation systems for model animals** • **Evaluate and database test results for long-lifespan target substances**

Key Research Area

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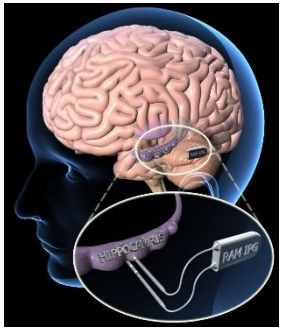
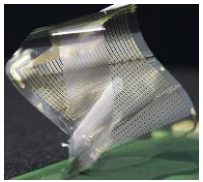
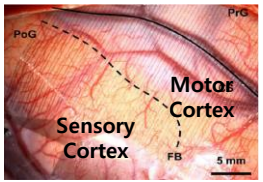
Advanced Bio

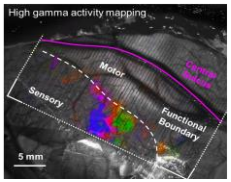
Development of a Multi-Channel Micro-ECoG Device for Human Brain Applications

"AI Chip for Restoring Consciousness Functions"

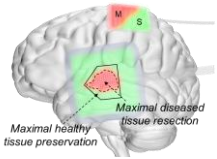


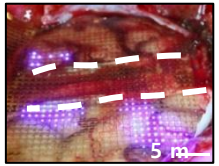


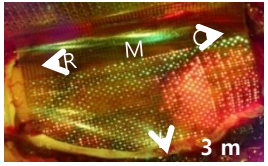




Y. Tchoe et al., Sci. Trans. Med (2022)







Y. Tchoe et al., Sci. Trans. Med (2024)

Communication with Patients with Disorders of Consciousness

Key Research Area

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Semiconductors

Key Research Area

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Semiconductors

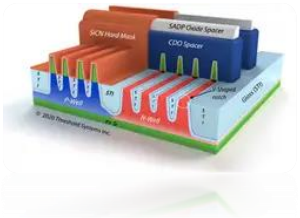
Semiconductor Materials

- Next-generation semiconductor materials
- Semiconductor materials & process simulation

Semiconductor Processes

- Advanced memory materials and devices
- 3D integration technology

Semiconductor Devices



- Next-generation packaging technology
- Artificial intelligence neuromorphic semiconductors
- Magnetic memory and logic devices

Circuits & Application Systems

- Next-generation interconnection technology
- Oxide semiconductors

Next-generation semiconductor materials	Advanced memory materials and devices	Oxide-based memory materials and devices	Magnetic memory and logic devices	Next-generation interconnect technology
Semiconductor material/process simulation	3D integration technology	Next-generation packaging technology	AI-based neuromorphic semiconductors	Oxide semiconductors

UNIST Start-up Companies

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Startups **192**

78 Faculty Startups

114 Student Startups

5-Year Survival Rates **70.7%**

88.9% Faculty Startups

55.6% Student Startups

UNIST Start-up Companies

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Business Valuation

$1.0 billion

Revenue

$230 million

Employment

613

$1.232 billion

BTS Billboard No.1 impact

$1.377 billion

Starbucks Korea's annual revenue

About one-third the economic impact of Netflix Korea

UNIST Start-up Companies

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Clinomics

Liquid biopsy–based early cancer detection

- Founded in 2011
- Listed on KOSDAQ(2020
- Registered as a Hi-Tech Innovative Company

RECENS MEDICAL

Ocular cooling anesthetic device OcuCool

- Founded in 2016
- Recipient of the USD 5 Million Export Tower Award (2022)
- First Korean medical device to receive FDA De Novo approval and complete Phase 3 clinical trials (2024)

SMLAB
Singular Materials Laboratory

High-density, long-life lithium battery cathodes

- Founded in 2018
- Designated as a Preliminary Unicorn Company (2021)
- Holder of National High-tech Strategic Technology (2024)
- Recognized as a National Strategic Technology (2024)

CLASS101
Student Startup

Online hobby and career learning platform

- Founded in 2018
- UNIST's first student startup team
- Over 2,000 lectures on startups and financial technology
- More than 3 million members
- Entered markets in the U.S., Japan, and Southeast Asia

Research Support Infrastructure

UNIST We're Pioneers!

UCRF (UNIST Central Research Facilities)

Mission

- Centralize and promote shared use of advanced research equipment
- Provide professional analytical, processing, and fabrication services

Facilities

511 units

83 Billion

Aberration-corrected Transmission

5-Axis CNC High-Speed

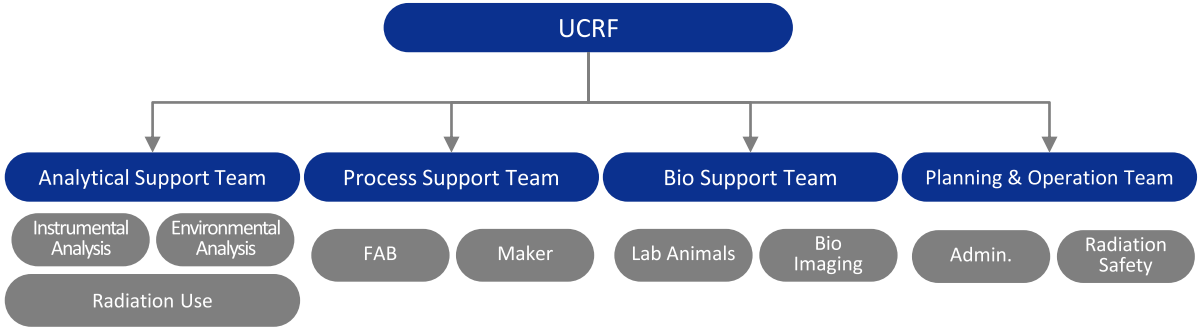
Electron Beam Lithography

TOF-SIMS

High-Resolution Mass Spectrometer

Organization

40 professional staff with Master's and Doctoral degrees



Research Support Infrastructure

UNIST We're Pioneers!

Super Computing Center

Mission

- Provision of High-Performance Computing (HPC) Resources for Advanced Research

Role

- Empowering advanced research through HPC, data, software, and expert support
- Comprehensive HPC infrastructure with education, consulting, and technical assistance for researchers and students

Equipment

Category	Type(Manufacturer, etc.)	Quantity(Capacity)
GPU	A100 (Nvidia)	24 units
	K80 (Nvidia)	10
CPUI	7 Cluster	6,000 cpu core
Storage	Lustre	26TB
	NFS	66TB
	IBM GPFS	1.1PB
Network Switch	Mellanox, OPA	100G IB ~ 56G IB

Status

Materials, Nanotechnology	Life & Health	Climate, Weather	Auto Driving	Space	Nuclear Fusion & Accelerators	Disaster & Hazard
UNIST	NIAS	KMA	GIST	IBS	Korea Institute of Fusion Energy	KHOA

Research Support Infrastructure

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3D Printing Convergence Technology Center

Mission

- R&D on 3D printing parts and materials
- Support for digital solutions in 3D printing processes

40.9 billion

57 units

21 professionals

Overview

Site Area	Gross Floor Area	Construction Cost
5,051 ㎡	4,347 ㎡ (B1 ~ F4)	KRW 40.9 billion

Facilities

3D Printers	Eng. Equipment	Post-processing	Measurement	Other
12	11	9	4	21

Key Fuctions

1 **R&D Stream & 3DP Reference Development**

2 **Output/Process Data Accumulation**

3 **R&D Support/Solution Development**

Tailored 3DP Parts for Diverse, Small-batch Production

Product Prototyping

Accumulation of Process Data

- **3DP Printing Workflows**
- **3DP Digital Solutions**

Development of Digital Tech. for 3 D Printing Process Control

Status of International Partners

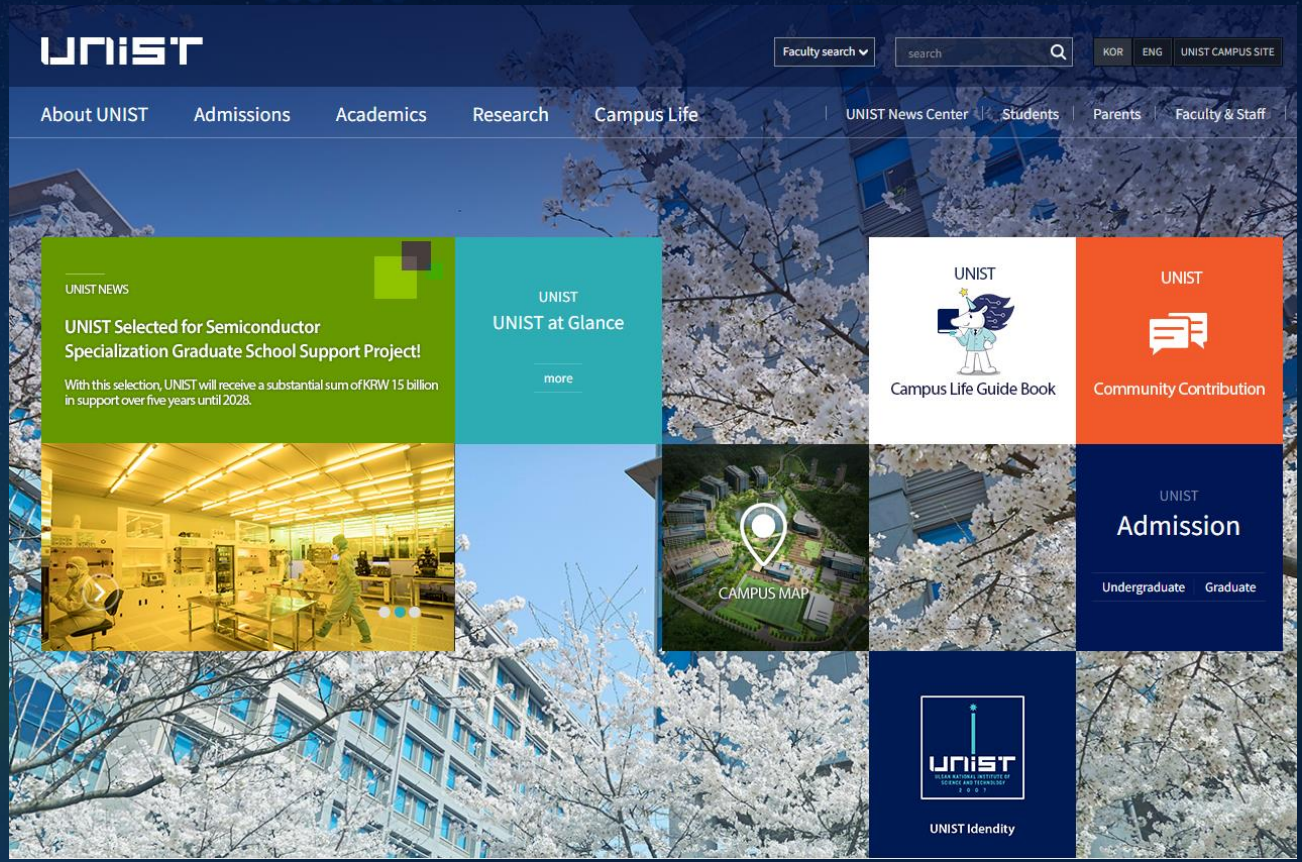
34 countries

103 Organizations

Campus Facilities

UNIST Main Homepage

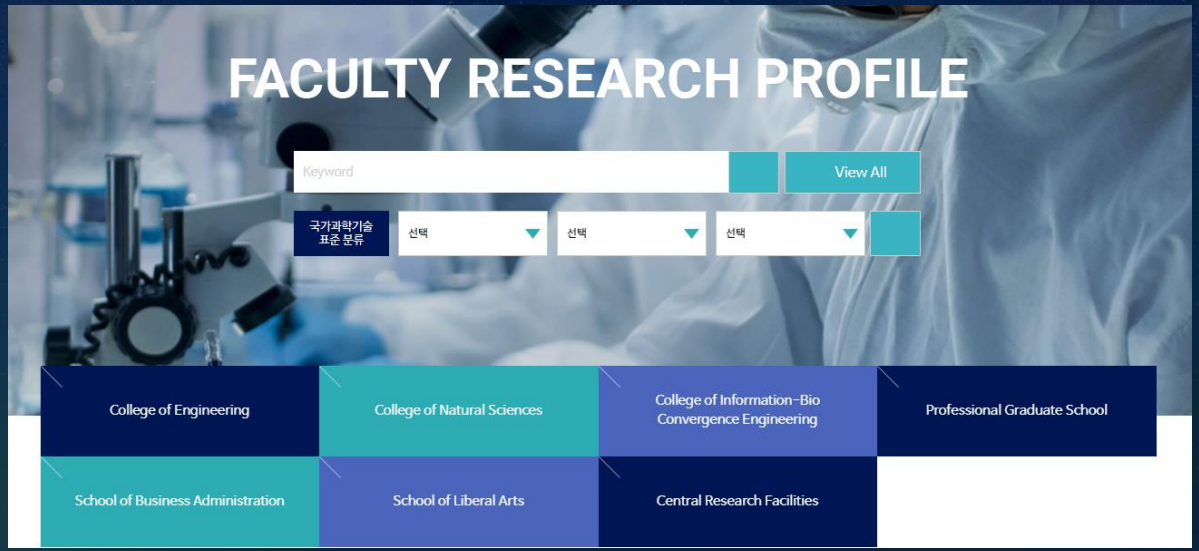
https://www.unist.ac.kr/



More about UNIST Researchers

UNIST Faculty Research Profile

https://research.unist.ac.kr/faculty-research-profile/?eng



Thank you!

Contact:

KwanMyung Kim
Dean of Research Affairs
Kmyung@unist.ac.kr
+82 52 217 2714

Do Hun Kwon
International Research Manager
dhkwon@unist.ac.kr
+82 52 217 1172