KIMM
K-MACHINE

www.kimm.re.kr

AI +
Hydrogen H_2 +
Bio-Health
Digital +
Convergence +

Global Comprehensive Research Institute leading "K-Machine"

KIMM'S ORGANIZATION

- Board of Directors
- President
  - Department of Audit & Anticorruption
  - Center of R&D policy
  - Department of External Relations
- Vice President
  - R&D Dissemination Division
    - Department of Technology Commercialization
    - Department of Enterprise Support
    - Department of R&D Management
  - KIMM School

Research Institute of Autonomous Machinery
- Semiconductor Manufacturing Research Center
- Department of Ultra-precision Machines & Systems
- Department of Laser & Electron Beam Technologies
- Department of 3D Printing

Nano-convergence Manufacturing Research Division
- Nano-lithography & Manufacturing Research Center
- Department of Nano-devices & displays
- Department of Advanced Battery Manufacturing Systems

Planning Division
- Department of Planning & Budget
- Department of Human Resources Development
- Department of Accounting
- Department of IT Management

Research Institute of Carbon-neutral Energy Machinery
- Liquid Hydrogen Technology Research Center
- Heat Pump Research Center
- Department of Energy Storage Systems
- Cryogenic Machinery Demonstration Research Center

Eco-friendly Energy & Environment Research Division
- Department of Urban Environment Research
- Department of Carbon-free Power Generation
- Department of Resources Recirculation Research
- Department of Eco-friendly Mobility Power

Administration Division
- Department of Human Resources Management
- Department of Safety & Health
- Department of General Affairs
- Department of Procurement & Asset
- Department of Infrastructure & Security

Research Institute of AI Robotics
- Advanced Robotics Research Center
- Department of AI Machinery
- Department of Bionic Machinery

Virtual Engineering Platform Research Division
- Virtual Engineering Research Center
- Department of Industrial Machinery DX
- Department of Reliability

Adhocracy Organization
- Autonomous Disease and Pest Forecasting Platform for Open Field Fruit trees
- The Defense Technology Research and Development Center
- Center for Plasma Process for Organic Material Recycling
- Nature-Inspired Research Center
- DX Strategy Research Center

Busan Machinery Research Center
- Department of Industrial Laser Technology
- Department of Automotive Parts
- Department of Nuclear Equipment Qualification & Safety

Daegu Research Center for Medical Devices & Robotics
- Department of Medical Devices
- Department of Medical Robotics

KIMM'S GENERAL STATUS

Vision
Global Comprehensive Research Institute leading "K-Machine"

Goal
"Digital-KIMM" by 2030

- Lay the foundation for AI · digital transformation
- Establish and nurture a representative brand
- Secure original technology & Accelerate commercialization

Core Value
- V — Voice of Customer
- V — Value Creation
- I — Integrity
- P — Pioneer

Strategy
- B — Big Picture
- E — Essence
- S — Speed
- T — Talent

Personnel
Unit Persons, 2025

538

Researchers	Engineers	Administrators	General Assistants
371	72	73	22

Budget
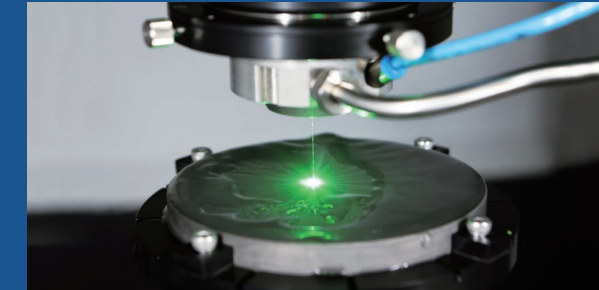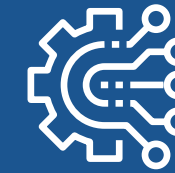Unit Million USD, 2025

Income — 129
- Government Funding — 49
- Institute Revenue — 80

Expenditure
- Research Expenditure — 80
- Personnel — 36
- Others — 13

Research Institute of Autonomous Manufacturing

The Research Institute of Autonomous Manufacturing conducts research on manufacturing equipment and process technologies to foster innovation and advance autonomous manufacturing. We combine cutting-edge manufacturing technologies with digital twin, AI, monitoring, diagnostic, and autonomous operation technologies to revolutionize manufacturing efficiency and flexibility.

1 Semiconductor Manufacturing Research Center
- Advanced semiconductor packaging processes and equipment
- Semiconductor FAB processes and equipment
- Autonomous semiconductor manufacturing technology
- Plasma source for chemical, environmental, and energy applications

2 Department of Ultra-precision Machines and Systems
- Design and process technologies for ultra-precision machining systems
- Design, analysis, control, measurement, compensation, and monitoring technologies for precision manufacturing equipment
- Digital twin and automation technologies for autonomous manufacturing systems

3 Department of Laser and Electron Beam Technologies
- Optical modules and laser machine
- Industrial laser sources
- Laser/Electron beam process and system technology
- AI based process prediction, measurement, diagnostic, and control technology

4 Department of 3D Printing
- Core components for additive machine
- Intelligent additive processes and autonomous additive manufacturing systems
- DfAM(Design for Additive Manufacturing) and evaluation
- Convergence manufacturing based on additive processes

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Research Institute of Carbon-neutral Energy Machinery

The Research Institute of Carbon-neutral Energy Machinery conducts energy technology development to establish a carbon-neutral energy supply chain. We conduct research on hydrogen liquefaction, liquid hydrogen storage and supply systems, high-efficiency eco-friendly heat pump systems, and high-capacity energy storage systems. In addition, we develop, evaluate the performance of, and certify thermo-fluid equipment, such as compressors, including heat exchangers, pumps, turbines, and heat exchangers, that are core components for these systems.

1 Liquid Hydrogen Technology Research Center
- Liquid Hydrogen Technology Research Center - Liquid hydrogen system and core equipment technology
- Liquid hydrogen-based energy supply chain technology
- Energy production facility and renewable energy convergence technology
- Plant operation and maintenance technology

2 Heat Pump Research Center
- High-efficiency, eco-friendly heat pump system technology
- Core heat pump components, including heat exchanger, technology
- Applied heat pump and heat energy networking technology
- Thermal processing and high-performance energy conversion technology

3 Department of Energy Storage Systems
- Cryogenic energy storage systems
- High-efficiency power and refrigeration cycle thermo-fluidic machinery
- Cryogenic refrigeration and liquefaction systems
- Turbomachinery

4 Cryogenic Machinery Demonstration Research Center
- Cryogenic systems and equipment
- Cooling and demonstration technology of cryogenic system and liquid hydrogen
- Evaluation and testing technology for cryogenic system and equipmenty
- KOLAS and KR certification for cryogenic system and equipment

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## Research Institute of AI Robotics
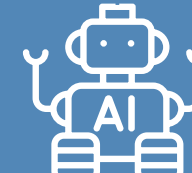
To build a future in which humans and robots co-exist, we are developing AI-based autonomous manipulation technology for application in next-generation robots, human-robot cooperation technology, key robotic performance technology, and innovative design technology.

1 Advanced Robotics Research Center
- High-difficulty robotics task technology
- Human-support robot technology
- Humanoid robot technology
- Core robot component technology

2 Department of AI Machinery
- Robot manipulation and movement AI
- Human-robot collaboration AI
- Mechanical system AI
- Magnetic levitation and actuation technology

3 Department of Bionic Machinery
- Bionic machine technology
- Smart sensors and free-form electronics technology
- 3D bio-printing technology
- Nature-inspired technology

# Nano-convergence Manufacturing Research Division
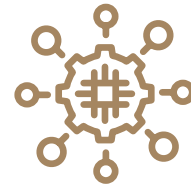
The Nano-convergence Manufacturing Research Division develops nano-convergence technology for future production by developing core technologies and conducting commercialization research.

① Nano-lithography & Manufacturing Research Center
- Nano-imprint lithography processes and equipment
- High-resolution digital lithography processes and equipment
- Ultra-precision machining and molding process and device fabrication

② Department of Nano-devices and displays
- Next-generation freeform display design and manufacturing equipment technology
- Nano-materials and -devices design, fabrication, and measurement technology
- Meta-structures and meta-structure applications design, fabrication, and measurement technology

③ Department of Advanced Battery Manufacturing Systems
- Next-generation secondary battery and flexible electronic component manufacturing processes and equipment technology
- Intelligent roll-to-roll printing and coating processes, equipment, and digital transformation technology
- Core advanced battery and flexible electronics technology
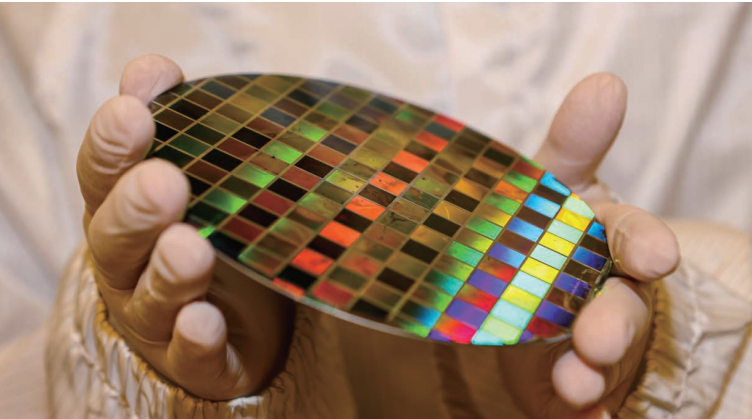
Virtual Engineering Platform Research Division
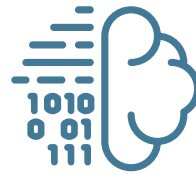
The Virtual Engineering Platform Research Division develops technology used to design, analyze, and evaluate large and complex mechanical system, digital twin, and integrated operation platform technology based on virtual engineering and AI technology to achieve digital transformation. Our main research areas include naval vessels, power generation systems, industrial machinery, plant and shipboard mechanical parts and equipment, mechanical system safety and reliability, autonomy, and virtual, augmented, and mixed reality.

① Virtual Engineering Research Center
- Machine safety and prognostics and health management AI
- Digital twins for dynamic systems
- Multiphysics modeling, simulation, and evaluation techniques for complex mechanical systems

② Department of Industrial Machinery DX
- Digital transformations for smart industrial machines
- Digital transformations and evaluation of powertrains
- XR-based industrial machine virtualization

③ Department of Reliability
- Reliability engineering digital transformation technologies, such as prognostics and health management, DfR, and AI
- Reliability assessment standards and equipment related to performance, environmental compatibility, safety, and lifespan
- Reliability technical support based on failure analysis, accelerated life testing, and system reliability analysis

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Eco-friendly Energy & Environment Research Division

The Eco-friendly Energy & Environment Research Division conducts research on high-efficiency, clean energy production technologies to reduce air pollution, slow global warming, and address other environmental issues. Our division develops core technology for various applications, including air and water treatment, gas turbines, engines, and combustors. We also develop highly efficient and environmentally friendly power generation systems based on these technologies for future use.

① Department of Urban Environment Research
- Reduction and exposure control technology for air pollutants such as fine particles, hazardous gases, and bio-aerosols
- Advanced water purification and wastewater treatment technology
- Urban, low-carbon, building-integrated vegetation technology

② Department of Carbon-free Power Generation
- Zero-carbon power generation system digitalization
- High-efficiency, zero-carbon power generation systems
- Fuel cell and electrolysis stacks and systems
- Gas turbine combustor design, testing, and certification

③ Department of Resources Recirculation Research
- Biomass and waste chemical recycling and energy recovery
- Resource conversion using waste-plastic pyrolysis and H2 generation technology
- High-efficiency hazardous waste incinerator technology
- Wastewater treatment and battery recycling

④ Department of Eco-friendly Mobility Power
- Carbon-free fuel mobility systems
- Mobility exhaust and non-exhaust emissions after-treatment systems
- Carbon-free fuel supply and reforming systems
- Low-temperature fuel cell technology
- Waste heat recovery and utilization technology

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Busan Machinery Research Center
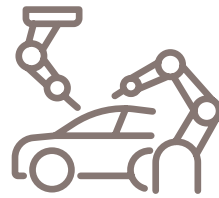
The Busan Machinery Research Center adds value to the mechanical part and material production industries by distributing laser processing, automotive part, and nuclear power plant safety technology to local companies and performing certification.

① Department of Industrial Laser Technology
- Laser beam processing application technology
- Laser and electron-beam manufacturing technology
- Dismantling laser systems
- Industrial technology support and transfer

② Department of Automotive Parts
- E-powertrain and control algorithms
- Water electrolysis cell and system development and evaluation
- Technical support, performance development and evaluation, and certification for HEV, EV, FCEV, and their parts

③ Department of Nuclear Equipment Qualification and Safety
- Nuclear equipment design, qualification, safety evaluation technology
- Nuclear power plant decommissioning- and radioactive waste-related machinery technology
- Defense, aviation, and shipbuilding reliability verification and engineering technology

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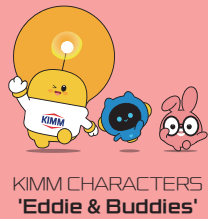# Daegu Research Center for Medical Devices & Robotics
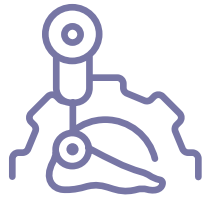
The Daegu Research Center for Medical Devices and Robotics conducts research related to medical devices and robots to improve quality of life, advance medical technology, and promote the Daegu-Gyeongbuk region's mechanical manufacturing industry in accordance with government policy.

① Department of Medical Devices
- On-site diagnosis platforms for rapid, precise, autonomous monitoring
- AI-based digital healthcare technology
- Bio-chip and bio-sensor design and fabrication technology
- Bio-signal, neural signal, and biomechanical analysis

② Department of Medical Robotics
- AI-based image processing and image-guided navigation technology
- Robot mechanism design technology
- Remote operation and haptic feedback interaction controls
- Wearable exoskeleton technology