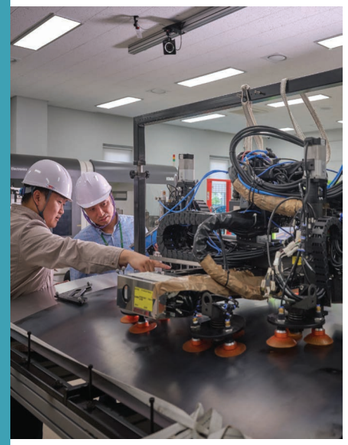
KIMM INSTITUTE OF MANUFACTURING SYSTEMS

We raise the competitiveness of Korean manufacturing industry.

The KIMM Institute of Manufacturing Systems conducts research on the original technology and commercialization for manufacturing equipments, focusing on the smart advanced-manufacturing equipments for existing key industries as well as on the nano-convergence-based new future industrial manufacturing equipment. We also develop policies for the manufacturing equipment and support industries in all life-cycle.

ADVANCED MANUFACTURING SYSTEMS RESEARCH DIVISION



We develop the state-of-the-art mechanical technology to make every industrial site smarter.

The Advanced Manufacturing Systems Research Division conducts research for manufacturing innovation based on ultra-precision positioning technology, energy beam processing technology, ultra-light high-power actuator, and additive convergence manufacturing technology. The technologies developed through this process form the core of manufacturing equipment such as next-generation processing systems, semiconductors, displays, 3D printing system, and general machinery.

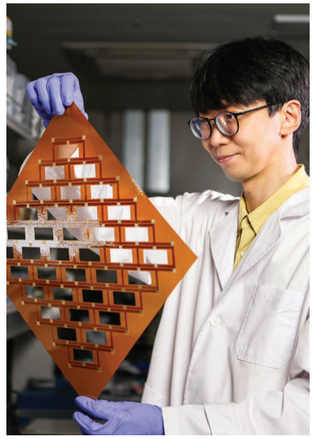
Research Areas

- Equipment and processing technologies for manufacturing of ultra-precision parts and ultra-fine electronic devices
- Laser processing equipment and technologies for manufacturing of semiconductors, display, and future cars
- Design, processing and equipment technologies for optimized 3D Printing

Major Achievements

- Ultra-precision roll lathe to produce large-area micro-patterned optical films
- Real-time synchronization technology between a scanner and a stage for high-speed/high-precision laser machining
- Maximize the performance of defense and industrial parts with metal 3D printing technology

NANO-CONVERGENCE MANUFACTURING SYSTEMS RESEARCH DIVISION



With nano-technology and machinery, we lay the foundation for a new industry.

The Nano-Convergence Manufacturing Systems Research Division aims to foster nano-convergence technology as a new future industry by developing the core technologies and conducting research for commercialization.

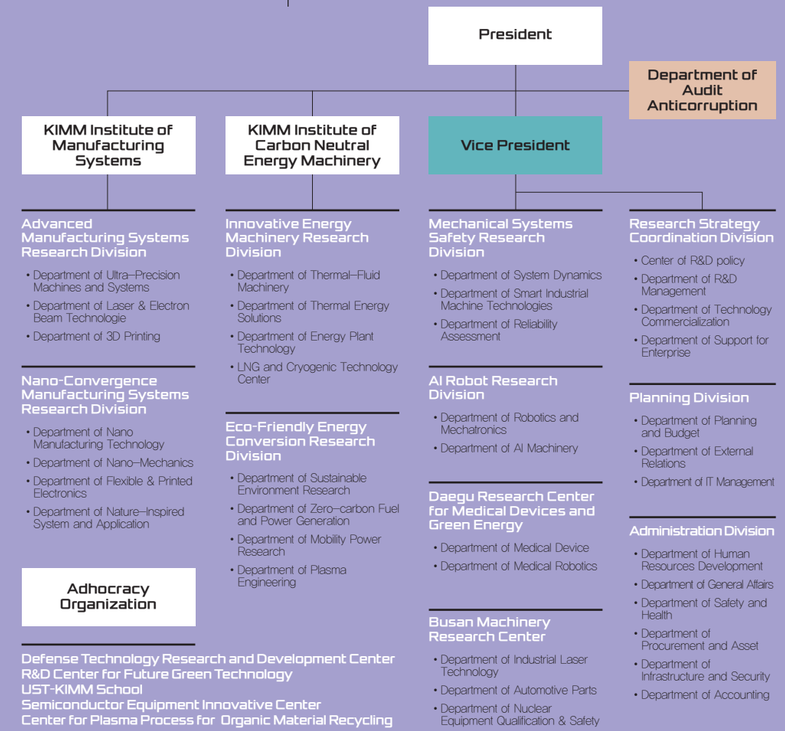
Research Areas

- Technologies for high precision machining, nano-imprinting · forming, and optomechanics-based nano-patterning
- Technologies for the design, measurement, reliability assessment of nano-structures, as well as the manufacturing of nanomaterials and devices
- Technologies for the flexible & printed electronics process/ equipment, roll-based continuous production system
- Design and application technologies for the nature-inspired structures · functions

Major Achievements

- Step-and-repeat nano-imprint lithography (NIL) system and processing technology
- Original technologies for roll-based transfer techniques and related equipment for the Micro-LED display
- Roll-to-Roll (R2R) fine pattern printing process and equipment technologies
- Multi-functional nanostructure implementation technology based on nature-inspiration

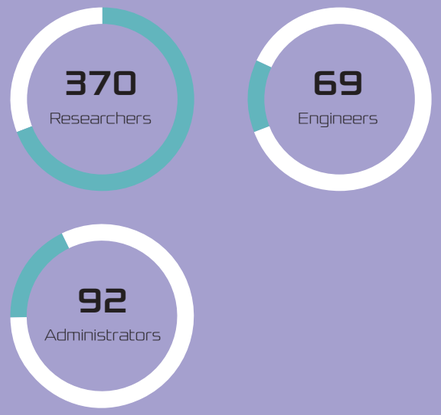
ORGANIZATION



PERSONNEL

531

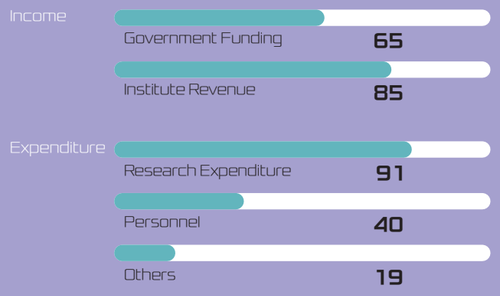
Unit
Persons, as of 2023



BUDGET

150

Unit
Million USD, as of 2023



KIMM CHARACTERS
'Eddie & Buddies'

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KIMM

Korea Institute of Machinery & Materials

ENHANCING
FUTURE PROSPECTS
THROUGH
MECHANICAL TECHNOLOGY
INNOVATION

KIMM KOREA INSTITUTE OF MACHINERY & MATERIALS

KIMM INSTITUTE OF CARBON NEUTRAL ENERGY MACHINERY

We lead the researches for the '2050 Carbon Neutrality'

The KIMM Institute of Carbon Neutral Energy Machinery conducts research on the proprietary technology and commercialization of core machinery for the production, conversion, storage and utilization of zero-carbon energy. As a national research institute, we also provide policy planning/development and industrial supports for the energy and environment areas.

INNOVATIVE ENERGY MACHINERY RESEARCH DIVISION

We research on the energy technology for the future.

The Innovative Energy Machinery Research Division conducts research on thermal-energy conversion utilization system, large-capacity energy storage system, hydrogen liquefaction and liquid hydrogen storage/supply system to secure future carbon neutral energy technologies. In addition, we develop thermo-fluid equipment such as compressors, pumps, turbines, heat exchangers and valves that are core machinery for these systems, as well as conduct performance evaluation and test certification.

Research Areas

- Technologies for high efficiency fluid machinery
- Technologies for thermal systems and processing
- Technologies for energy plant process and equipment, including the liquefied hydrogen system
- Performance test and certification technologies for LNG · cryogenic equipment

Major Achievements

- Low-vibration cryopumps for fast regeneration
- High efficiency micro channel heat exchanger
- Hydrogen liquefaction plant process and core equipment
- Performance evaluation system of core equipment for LNG carriers and plants

ECO-FRIENDLY ENERGY CONVERSION RESEARCH DIVISION

We lead in developing eco-friendly energy technology for the Earth.

The Eco-Friendly Energy Conversion Research Division researches the high efficient and clean environmental technologies to cope with air pollution, global warming and other environmental issues. Our division has the core environmental technologies in plasma, air · water treatment, gas turbines, engines, combustors, and so on; based on these technologies, we are developing highly-efficient and environmentally friendly power generation systems for the future.

Research Areas

- Environmental machine technologies for air/water pollutions
- Technologies for carbon neutral fuel production and high-efficiency power generation system
- Technologies for zero/low carbon gas engines, hydrogen/ammonia power sources, and high-efficiency mobility power system
- Plasma processing and equipment technology for environment · energy · chemical plant · semiconductor · display

Major Achievements

- Technologies for filter-free electrostatic precipitation and air purification control
- Localization of low NOx emission gas turbine combustor for large-scale industrial power plants
- H2 direct injection engine
- Low-pressure plasma technology for eco-friendly semiconductor processing

MECHANICAL SYSTEMS SAFETY RESEARCH DIVISION

We add safety and reliability to large, complicated mechanical systems.

The Mechanical Systems Safety Research division concentrates on the development of core technologies for the design and engineering of large and complex mechanical systems, integrated systems technology, and new mechanical systems, using safety and reliability technologies. Its main research areas include urban or high-speed magnetically-levitated trains, wind turbine systems, dynamic modeling and simulation (M&S), and control technologies, as well as safety and reliability technologies for mechanical and structural systems.

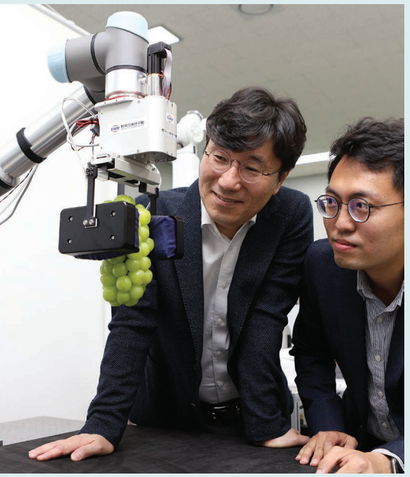
Research Areas

- Design, analysis and control technologies for acoustics, vibration, and shock on mechanical/structural system
- Core mechanical technologies for digital conversion
- Smart technologies for industrial machinery/core parts
- Technological supports for development of reliability assessment system & reliability standards, and for reliability enhancement

Major Achievements

- AI-based diagnosis/prognosis and damage management technology
- Naval ship survivability enhancement design
- Autonomous driving of agricultural tractor
- Mobile autonomous working machine technology
- Technology for acquiring reliability-based competitiveness of domestic mechanical and mechatronics parts · equipment

AI ROBOT RESEARCH DIVISION



We are developing intelligent robot technology that will enrich the future of mankind.

For a future where humans and robots coexist, we are developing AI-based autonomous manipulation technology for the next generation robots, human-robot cooperation technology, key component technology that determines the performance of robots, innovative design technology and robot application technology using it.

Research Areas

- Technologies for robot intelligence and autonomous manipulation robot
- Innovative robot design & robot core parts
- Technologies for robot application & human support robot
- Technologies for AI-based autonomous mechanical system

Major Achievements

- All-round gripper capable of handling objects of all shapes
- Robot hand capable of handling everyday tools
- Artificial muscle-based cloth-type actuator for the implementation of a suit-type robot
- Autonomous mobile manipulator for unstructured environments
- Smart disinfection robot for crowded spaces
- Dual-arm robot for difficult and complex tasks

DAEGU RESEARCH CENTER FOR MEDICAL DEVICES AND GREEN ENERGY

Our medical device technologies can make people' s lives more prosperous.

The Daegu Research Center for Medical Devices and Green Energy focuses on researches associated with medical devices and medical robots with an aim to improve the quality of people's life, and also to play an important role in advancing medical technology and promoting mechanical-manufacturing industry of Daegyeong region in accord with government policy.

Research Areas

- On-site diagnosis platform for rapid and automated disease detection
- Analytical technologies for biosignals and biomechanics
- Technologies for physical-ability-restoration and rehabilitation robot
- Tele-operated diagnostic/surgical medical robots

Major Achievements

- "Point-of-care(POC)" molecular diagnostics system
- Wireless brain/muscle signal measurement system
- Smart robotic prostheses for lower-limb amputees
- Remote sampling robot for respiratory diseases

BUSAN MACHINERY RESEARCH CENTER

We thrive to achieve technological advancement of industries in the southeastern area.

The Busan Machinery Research Center tries to achieve high added value in the mechanical parts and materials industry by distributing laser processing technology, automotive parts technology, and nuclear power plant safety technology to local companies and performing test certification support.

Research Areas

- Supply and support for laser processing technologies
- Future-automotive parts technologies and certification
- Technologies for nuclear equipment/parts engineering, and safety evaluation

Major Achievements

- Underwater laser cutting technology for safe decommissioning of nuclear power plants
- Exhaust gas after-treatment system for diesel transfer cranes at the Busan Port
- Survivability evaluation technology of nuclear power plant equipment in severe accident conditions