The Role of National NanoFab Center for advancing nanotechnology research, education, and commercialization in Korea

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Public semiconductor fabrication facilities play a crucial role in advancing nanotechnology research, education, and commercialization. One of their core functions is to democratize access to expensive nanofabrication equipment for universities and small companies while enabling research that would otherwise be cost-prohibitive.

Established in 2004 as an affiliated organization of Korea Advanced Science and Technology (KAIST) in Daejeon, Korea, NNFC has focused on supporting domestic industries, academic institutions and other R&D institutes with a world-class infrastructure in the cleanroom environment. Its main service domains include semiconductor fabrication platforms for testbed service (8 inch and 12 inch) and logic CMOS (8 inch/0.18um), semiconductor and display convergence technology platforms, nano-biosensor/chip fabrication platforms, MEMS sensor fabrication platform and analysis and measurement service. For education and training, its Semiconductor Academy offers education courses with hands-on experience for high school, college students and graduates in the semiconductor cleanroom. The Academy also offers continuing education programs for semiconductor professionals in industry.

As technology advancement in the semiconductor industry faces complex challenges, collaboration among academia and research institutes including public semiconductor facilities is becoming more important than ever. NNFC has been collaborating with the New York Center for Research, Economic Advancement, Technology, Engineering and Science (NY CREATES) since May, 2024; professors from both countries are working on the same topics using either NNFC or NY CREATES facilities and some Korean companies are in discussion with NY CREATES for testbed services. Starting this year, NNFC will send more than 10 graduate students every year to IMEC where they are working as research assistants in semiconductor related research projects. All funding for the collaboration with NY CREATES and IMEC is provided by the Ministry of Science and ICT. For testbed services, NNFC is open to foreign entities including academia and industry and currently we have several customers from USA, Sweden and Germany for processing wafers and devices.

NNFC will focus mainly on three initiatives;

1) enhancing collaboration and cooperation between domestic and international public semiconductor facilities and the private sectors
2) upgrading in-house capabilities to keep up with future technologies such as advanced packing technology, quantum sensor technology and AI
3) maintaining sustainability with ‘safety first’ principle and improving energy efficiency while following green chemistry principles.