

The 830-m<sup>2</sup> super cleanroom at the Hiroshima University Research Institute for Nanodevices. It is open to outside organizations and serves as a setting for collaboration among industry, academia, and government, and between different academic disciplines.



## JAPAN-U.S. PARTNERSHIP TO FOSTER DIVERSE TALENT FOR THE SEMICONDUCTOR INDUSTRY

*With society undergoing rapid digitalization, semiconductors are a key technology that is essential to the realization of digitalization and decarbonization, as well as a crucial strategic material in light of economic security. Japan and the United States have joined forces to cultivate a more robust and highly skilled workforce in this field.*

Semiconductors are integrated into many objects, from familiar electronic devices such as the smartphones and PCs we use in our daily lives to such basic social infrastructure as railroads and bank ATMs. Some say these materials, which process information for data storage, numerical calculations, and logical operations, are among the world's most critical resources in an age when all sorts of industries and products have been digitalized and vast amounts of data are exchanged over the Internet

on a daily basis. Even so, only a limited number of companies in the world can manufacture these components, thus it is urgent to decentralize semiconductor production bases and strengthen the capacity for their supply. Moreover, as digitalization spreads and grows ever more sophisticated, they must be technologically innovated to have even greater capacity, speed, miniaturization, reliability, and power efficiency.

That is why the U.S.-Japan University Partnership for



TERAMOTO Akinobu, Director and Professor of the Research Institute for Nanodevices at Hiroshima University, conducts research on structural design, manufacturing processes, and evaluation techniques for semiconductor devices. After working for Mitsubishi Electric Corporation as an engineer for a decade, he was a professor at the New Industry Creation Hatchery Center at Tohoku University before assuming his current position.

Workforce Advancement and Research & Development in Semiconductors (UPWARDS) for the Future was established in May 2023. With more than 60 million dollars in contributions expected over the next five years from a variety of sources including semiconductor companies, the partnership will deepen ties between industry and higher education across Japan and the U.S. Aimed at cultivating a more robust and highly skilled workforce through the development of leading semiconductor curricula and the creation of opportunities for cross-collaboration, the partnership will drive emerging research.

Japan's Hiroshima University is one of 11 institutes of higher education involved in UPWARDS for the Future. With a campus in Hiroshima Prefecture, the site of this year's G7 summit, it has one of the longest histories of semiconductor research in Japan. TERAMOTO Akinobu, Director of the Research Institute for Nanodevices at the university, said, "I think the partnership holds great significance because it allows us to build a network as a system, rather than relying



The facade of the Hiroshima University Research Institute for Nanodevices. Formerly named the Research Center for Integrated Systems, it was established in 1986.

solely on individual researchers' personal connections. Through exchanges with various universities and companies, we hope to nurture a workforce with a high level of expertise as well as broad perspectives that allow them to see the big picture in the semiconductor industry."

AOTO Nahomi, who used to work for Hiroshima-based Micron Memory Japan, K.K., a subsidiary of U.S. semiconductor manufacturer Micron Technology, Inc., is a specially appointed professor at the university. She said enthusiastically, "Without semiconductors, we cannot build our world's future. No other industry is growing like this one. There is a common misconception that Japan's semiconductor industry has declined, but in fact, sales of the product have held steady, and Japan still boasts advanced technological capabilities pertaining to semiconductor memory. We want to inform more people about the opportunities presented by semiconductors and attract more talent to support the industry. That is our primary goal with UPWARDS for the Future."

Providing opportunities for female students, staff and leaders, in particular, is another important objective of the partnership. Hiroshima University has already been offering scholarships and other support to women, but the partnership will further expand upon that. The purpose of focusing on support for women is not simply to recruit more excellent talent. Aoto said, "I feel that



AOTO Nahomi is a professor (special designation) at the Research Institute for Nanodevices at Hiroshima University. In the four decades since she was hired by NEC Corporation in 1983, she has been engaged in semiconductor-process research and development. During that time, the company was reorganized into Elpida Memory, Inc., and later became Micron Memory Japan, K.K. In 2023, she was appointed to her position at Hiroshima University.

semiconductor manufacturing is an industry in which employees are fairly evaluated and enjoy equal opportunities regardless of their gender. I want to tell as many people as possible that this is a place where women can demonstrate their abilities and flourish." She added, "From my own experience at Micron, where people from diverse backgrounds work, I am absolutely certain that both technology and society benefit when people from different backgrounds share their ideas and opinions."

Semiconductors are bound to become increasingly important for society's development and economic security. To create a more prosperous and stable world, universities and companies in both Japan and the U.S. will work closely together under UPWARDS for the Future to train a diverse semiconductor workforce and strengthen the industry's technology base. ●