

## **Applied Materials and A\*STAR's Institute of Microelectronics to Drive Advanced 3D Chip Packaging with World-Class R&D Lab in Singapore**

- *3D chip packaging expected to be a major inflection point for the semiconductor industry, allowing smaller packages, lower power consumption and higher data bandwidth*
- *Joint R&D Centre is first dedicated facility of its kind focused on developing next-generation packaging technologies to feed the explosive growth of mobile devices*

**SINGAPORE, March 7, 2012** – Applied Materials, Inc., the global leader in providing manufacturing solutions for the semiconductor, flat panel display and solar photovoltaic industries, and the Institute of Microelectronics (IME), a world-renowned research institute under the Agency for Science, Technology and Research (A\*STAR), officially opened the **Centre of Excellence in Advanced Packaging** at Singapore's Science Park II today. Singapore's Minister for Trade and Industry, Mr. Lim Hng Kiang, presided at today's opening ceremony.

The Centre of Excellence in Advanced Packaging has been built with a combined investment of over USD\$100 million from Applied Materials and IME. The world-class facility features a 14,000 square foot Class-10 cleanroom and is equipped with a fully-integrated line of 300 millimetre manufacturing systems to support the research and development of 3D chip packaging, a critical growth area for the semiconductor industry.

The Centre will be the most advanced lab of its kind dedicated to wafer level packaging and will combine Applied Materials' leading-edge equipment and process technology with IME's leading research capability in 3D chip packaging. The Centre positions Singapore as a global leader in semiconductor R&D and is expected to help accelerate the development and adoption of 3D packaging technology globally.

Traditionally, chips are connected to packages using wires attached to only their edges. This approach limits the possible number of connections from the chip and the long wire connections result in signal speed delays and power inefficiencies. With 3D chip packaging, multiple chips can be stacked on top of each other and connected with wiring that runs vertically through the stack – called through-silicon vias (TSVs). When used to stack memory chips on logic chips, this technology is expected to reduce package size by 35%, decrease power consumption by 50%, and increase data bandwidth by a factor of eight or more times.

Conceived to support research collaboration between Applied Materials and IME, the Centre will also allow both parties to pursue independent research initiatives including process engineering, integration and hardware development. For Applied Materials, this is a significant addition of new capabilities in Singapore. The Centre also serves as a demonstration of how A\*STAR is able to develop and nurture a local ecosystem for advanced R&D through partnerships with leading corporations. Research activities are already underway with a team of over 50 personnel.

“Today, we are not only opening the most advanced wafer level packaging lab of its kind in the world, but we are also opening a new product development capability for Applied Materials in Asia,” said Mike Splinter, Chairman and Chief Executive Officer of Applied Materials. “This Centre will strengthen our ability to advance new technologies and allow us to work more closely with our customers in Asia.”

On the collaboration with Applied Materials, Mr. Lim Chuan Poh, Chairman of A\*STAR, said, “The combined efforts of Applied Materials and A\*STAR’s Institute of Microelectronics are a continuing testimony to A\*STAR’s spectrum of excellent and industry-relevant scientific capabilities. It reaffirms our strategy of leveraging a suite of capabilities to form meaningful and impactful public-private research alliances which catalyse the growth of private sector R&D activities in Singapore. This will create many high-value jobs locally and help to further anchor Singapore’s semiconductor manufacturing base.”

Professor Dim-Lee Kwong, Executive Director of IME, added, “The Centre of Excellence is a prime example of a strategic relationship fostered between two leading players in the global semiconductor value chain and will spur the development of innovative wafer-level packaging technologies to be implemented globally. This collaboration will enable the semiconductor industry to accelerate the adoption of 3D chip packaging.”

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**About Applied Materials, Inc.**

Applied Materials, Inc. (Nasdaq:AMAT) is the global leader in providing innovative equipment, services and software to enable the manufacture of advanced semiconductor, flat panel display and solar photovoltaic products. Our technologies help make innovations like smartphones, flat screen TVs and solar panels more affordable and accessible to consumers and businesses around the world. At Applied Materials, we turn today's innovations into the industries of tomorrow. Learn more at [www.appliedmaterials.com](http://www.appliedmaterials.com).

**About Institute of Microelectronics (IME)**

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A\*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design, advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics.

For more information about IME, please visit [www.ime.a-star.edu.sg](http://www.ime.a-star.edu.sg).

**About Agency for Science, Technology and Research (A\*STAR)**

The Agency for Science, Technology and Research (A\*STAR) is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A\*STAR oversees 14 biomedical sciences and physical sciences and engineering research institutes, and six consortia and Centres, located in Biopolis and Fusionopolis as well as their immediate vicinity.

A\*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, hospitals, research centres, and with other local and international partners.

For more information about A\*STAR, please visit [www.a-star.edu.sg](http://www.a-star.edu.sg).