SEMICONDUCTOR ENGINEERING
DEEP INSIGHTS FOR THE TECH INDUSTRY

Week In Review: Semiconductor Manufacturing, Test

GlobalFoundries sues IBM; EU's $47B chips plan; China chip output falls; Space Forge opening US facility; first LPDDR flash memory; transformable nano-scale electronic devices; tabletop 3D X-ray microscopy.

APRIL 21ST, 2023 - BY: **GREGORY HALEY**

GlobalFoundries filed suit in U.S. District Court in New York against **IBM**, accusing it of unlawfully disclosing IP and trade secrets to IBM partners, including **Intel** and **Rapidus**, potentially receiving hundreds of millions of dollars in licensing income and other benefits.

The European Union released a €43 billion ($47 billion) plan for jumpstarting its semiconductor manufacturing industry, similar to programs in the United States and Asia, Reuters reported. The European Chips Act, proposed by the European Commission last year and confirmed by Internal Market Commissioner Thierry Breton, aims to double the bloc's share of global chip output to 20% by 2030.

SEMI applauded the provisional agreement. "The European Chips Act is a significant step forward for the semiconductor industry in Europe with robust investments to help strengthen manufacturing and the resiliency of global supply chains," said Ajit Manocha, SEMI President and CEO. "In addition, the Act will enable cohesive strategies to grow Europe's talent base and ensure the region remains at the forefront of innovation."

In the United States, a group of leaders from industry, government and academia convened at a summit on April 18 in Washington, D.C. — with hundreds of attendees representing more than 175 entities and 23 states — to focus on strategies to execute the vision outlined in the recently released CHIPS for America: Vision for Success. It highlighted the implementation of federal investments and future policy actions, and the creation of government, industry, and academic partnerships with a special focus on workforce development and research innovation.

Meanwhile, China's National Bureau of Statistics released economic data showing its semiconductor output fell nearly 15% in the first quarter year-over-year, partially a result of the U.S. and other nations' trade embargo, reports Bloomberg. Competitive pressure from new factories in other Asian countries, such as India and Vietnam, along with pressure on international tech companies like **Apple** to reduce manufacturing in China, also are affecting production output.

Trendforce reports that restrictions imposed by the U.S. CHIPS Act will continue to lower the willingness of multinational suppliers to invest in China, limiting Chinese semiconductor development for the next decade. The report includes recently released details from the U.S. Department of Commerce regarding the CHIPS and Science Act, which stipulates that beneficiaries of the act will be restricted in their investment activities—for more advanced and mature processes—in China, North Korea, Iran, and Russia for the next 10 years. The scope of restrictions in this updated legislation will be far more extensive than the previous export ban.

Advanced packaging has provided a significant boost to the memory packaging industry, according to a new report from **The Yole Group**. Overall memory packaging revenue was estimated at $15.1 billion in 2022, and is expected to grow to $31.8 billion in 2028 with a CAGR of about 13%. DRAM is forecast to reach $20.7 billion with a CAGR of 13%, as well, while NAND will grow faster at around 17%. Packaging revenue is forecast to reach $8.9 billion. The report notes that wirebond dominates the packaging market, followed by flip-chip, and OSATs account for more than one-third of the memory packaging revenue.

5G chip start-up **EdgeQ** announced it raised $75 million in venture capital to boost production of semiconductors that power base stations for 5G telecom towers and for 5G access points.

The UK-based company, **Space Forge Ltd.**, which is pioneering space-based super materials manufacturing, announced it is launching operations in the United States.

The company is considering several states for the site of the U.S.-based manufacturing headquarters to expand and strengthen its manufacturing partnerships, capitalizing on growing U.S. interest in super materials, and especially semiconductors, that can be manufactured in the ultrahigh vacuum environment of space.

Products/Technology

Brewer Science will present "New Developments in Underlayers and Their Role in Advancing EUV Lithography" at the Critical Materials Council (CMC) Conference.

Bruker announced the Ascend Evo 400 new standard 400 MHz NMR magnet with a liquid helium hold-time of one year to reduce cost of ownership and enhance operational convenience for NMR spectroscopy in life science, pharma, and cleantech research.

ProteanTecs announced it has joined the Innovative Optical and Wireless Network (IOWN) Global Forum. Founded by Nippon Telegraph and Telephone Corporation (NTT), Intel, and Sony, IOWN Global Forum is focused on defining next-generation communications infrastructure that includes advances in silicon photonics, edge computing, and wireless distributed computing through the development of new technologies, frameworks, specifications and reference designs.

EV Group and **Notion Systems** announced an agreement to develop the first fully integrated and automated nanoimprint lithography (NIL) solution with inkjet coating capabilities to be integrated in EVG's Hercules NIL platform. [Find a special report on nanoimprint here.]

Keysight expanded its Novus portfolio with the new Novus mini, a network test platform in a compact form factor that addresses the needs of network engineers as they deploy automotive and industrial internet of things (IoT) devices.

Marvell demonstrated 3nm high-speed, ultrahigh bandwidth silicon interconnects that include high-speed SerDes and parallel interconnects with die-to-die transfer speeds up to 240 Tbps, 45% faster than multichip package alternatives.

SK Hynix announced the first 12-layer HBM31 product with a 24 gigabyte (GB) memory capacity.

Research

The first transformable nano-scale electronic devices have been demonstrated by physicists at the University of California, Irvine. The devices are made of single-atom thick sheets of graphene attached to gold wires that can be transformed into a variety of different configurations on the fly, much like refrigerator door magnets – stuck on but reconfigurable.

Cadence, **ASE Group**, and **Chung Yuan Christian University** have developed a program to collaboratively educate, train and cultivate talent for 3D-IC Design. The group is building a teaching environment that combines Cadence software, ASE's shared practical experience and the Chung Yuan Christian University (CYCU) curriculum to allow students from the Department of Industrial and Systems Engineering (ISE) and other departments learn about Cadence packaging technologies.

Scientist at **NIST** have developed a novel tabletop device capable of taking 3D X-ray images of ICs. The X-ray CT system uses a focused ion beam from an SEM with a metal backplate behind the chip to detect defects in the device.

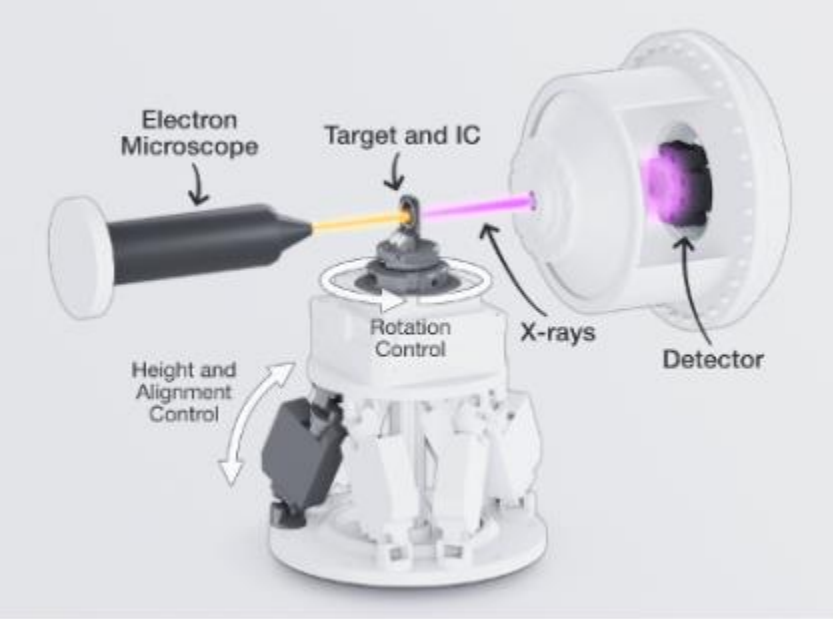

Fig. 1: Tabletop 3D X-ray machine. Source: NIST

Further reading

See our April Manufacturing, Packaging and Materials newsletter for these feature articles:

- Special Report: Nanoimprint Finally Finds Its Footing
- Assist Layers: The Unsung Heroes Of EUV Lithography
- Smarter Ways To Manufacture Chips

Read our April Test, Measurement & Analytics newsletter for these highlights and more:

- Special Report: Using AI to Improve Metrology Tooling
- What Data Center Chipmakers Can Learn From Automotive
- Challenges In Photonics Testing
- Challenges Grow For CD-SEMs at 5nm and Beyond

Upcoming events in the chip industry:

- SPIE Optics + Optoelectronics 2023, Apr. 24 – 27 (Prague, Czech Republic)
- TSMC 2023 Technology Symposium, Apr. 26 (Santa Clara, CA)
- COMSOL Day: Semiconductor Manufacturing, Apr. 27 (Virtual)
- Lithography Workshop, Apr. 30-May 4 (Sun Valley, Idaho)
- ASMC/WiS (Women in Semiconductors) 2023, May 1 – 4 (Saratoga Springs, NY)
- ITF World 2023-Imec's flagship event, May 16-17 (Belgium)

https://semiengineering.com/week-in-review-semiconductor-manufacturing-test-21/