# Semiconductor industry growth driven by AI technologies



The semiconductor industry is currently experiencing significant growth, largely driven by the rapid adoption of artificial intelligence (AI) technologies. As David K. Lam, Chairman and CEO of Multibeam, highlighted in an article for Semiconductor Digest, projections from leading AI enterprises suggest that a substantial increase in silicon production will be necessary by 2025 to satisfy the burgeoning demand for AI applications. This anticipated growth presents favourable prospects for both semiconductor manufacturers and wafer fabrication equipment suppliers.

In response to this escalating demand, the CHIPS Act is catalysing new investments within the domestic semiconductor sector. Efforts are concentrated on expanding fabrication capacities and enhancing research and development initiatives for new chip designs and multi-chip systems. Lam expressed particular enthusiasm regarding the National Advanced Packaging Manufacturing Program (NAPMP), which aligns with the industry’s shift towards advanced packaging technologies.

The demand for innovative processing solutions that accommodate the growing integration needs has been highlighted, particularly in the realm of advanced lithography technologies. Lam stated that these technologies are set to provide a larger field of view, increased depth of focus, and enhanced resolution—features that are essential for the next generation of multi-chip setups. An exemplar technology in this area is Multibeam’s multicolumn electron beam lithography (MEBL), which enables the writing of both fine and broad lines. This capability allows for denser chip placements within a package, which, in turn, optimises interconnect pitch density and reduces data path lengths between chips—resulting in lowered energy consumption during chip-to-chip communications.

The burgeoning landscape of AI, high-performance computing (HPC), and sectors such as memory, logic, and automotive are anticipated to continue fuelling the demand for advanced processors and efficient interconnections. High-density wafer-scale heterogeneous integration is crucial for the architectural design of leading CPUs, GPUs, and heterogenous memory, employing deep sub-micron interconnects to enhance bandwidth and diminish power consumption. This advancement facilitates fast chip-to-chip communication, making it vital for systems designers to achieve the required speed and efficiency inherent in modern computing demands.

Moreover, the revival of 200mm wafer fabrication facilities is set to persist through 2025, with various emerging technologies, including silicon carbide (SiC), micro-electromechanical systems (MEMS), and silicon photonics (SiPho), relying heavily on 200mm and smaller substrates. However, traditional optical lithography faces issues in addressing the complex patterning needs for these advanced technologies. Lam emphasised that high-productivity electron beam lithography systems, which offer next-generation resolutions and depth of focus capabilities, are well-equipped to tackle these challenges. This evolution is poised to enable efficient, sustainable, and rapid production processes at scale.

The industry outlook consequently remains upbeat, with the implications of these advancements promising a transformative impact on the strategies and operations within the semiconductor sector as it adapts to meet the increased demands of AI and related technologies.

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

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