

ASX Announcement ([ASX: AXE](#))

30 May 2022

Archer biochip progresses towards sub-10 nanometre fabrication

Highlights

- Archer achieves 15 nanometre (nm) feature size fabrication by developing advanced lithography processes.
 - The significant reduction of feature size would potentially allow for billions of sensors on Archer's biochip.
 - Archer's target is miniaturisation to sub-10 nm which is cutting-edge in the semiconductor industry.
 - The biochip is being developed in-house by Archer staff and Archer owns 100% of the biochip technology intellectual property.
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Archer Materials Limited ("Archer", the "Company", "[ASX: AXE](#)") is pleased to provide shareholders with a technical progress update on the Company's goal to achieve reliable fabrication of sub-10 nanometre ("nm") biochip device components.

In April 2021, the Company announced that it had commenced nanofabrication processes with the aim of developing sub-10 nm size biochip features representing the current 'best-in-class' in the semiconductor industry[†] ([ASX ann. 8 Apr 2021](#)). The Company recently expanded its access to state-of-art instruments and talent ([ASX ann. 15 Mar 2022](#)).

Archer has now successfully fabricated 15 nm features reproducibly and reliably by developing and implementing several advanced lithographic processes. The achievement of 15 nm feature size represents a minimum threshold of what is required for the development of Archer's technology and paves the way to miniaturisation below 10 nm.

The work is a significant technical achievement as the advanced lithography semiconductor fabrication processes are complex, requiring precision engineering to reach lateral control over a feature size of 15 nm (corresponding in this work to approximately 100 atoms).

Miniaturisation of device components is an incremental process with each reduction in feature size requiring new and optimised lithography processes of increasing complexity. Archer has achieved miniaturisation from 200 nm down to 15 nm by developing several advanced lithography processes (Image 1).

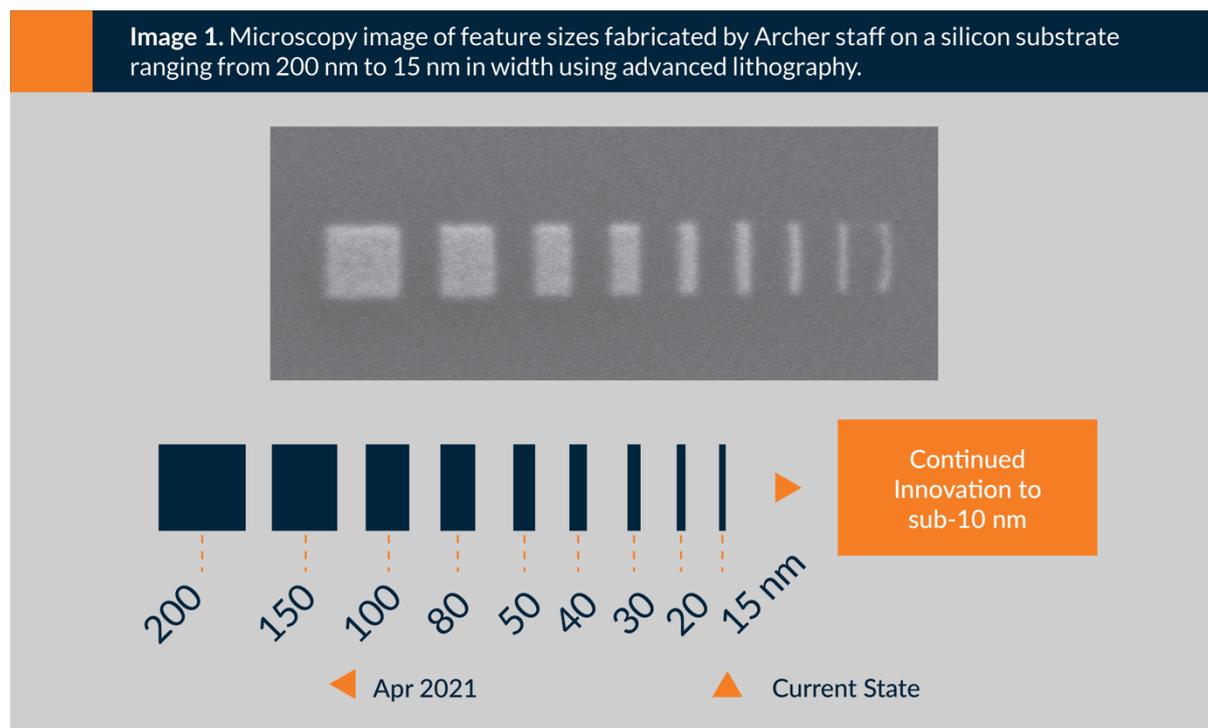
The extreme miniaturisation would give Archer greater flexibility and higher integration density in its lithographic processes for the design and fabrication of its technology.

[†] <https://www.chiefscientist.nsw.gov.au/independent-reports/australian-semiconductor-sector-study>

For example, sub-10 nm fabrication could allow for biochip device development to span a magnitude of feature sizes for potential sensing applications exceeding billions of sensors, and for the fabrication of devices the size of a single, isolated qubit material (approximately 40 nm[‡]).

Commenting on the recent Company progress, Archer CEO Dr Mohammad Choucair said: “Archer’s core business is the development of advanced semiconductor technology that is underpinned by the Company’s nanofabrication capabilities.

“Achieving 15 nanometre feature size is a great outcome. We have now prepared a suite of advanced lithography processes to reliably control fabrication for our device miniaturisation and scaling as we continue to advance towards breaking through the 10 nanometre barrier.”



Further information on Archer’s biochip development

The Company is developing a biochip that would allow droplets of biological specimens to be analysed and processed using graphene-based sensors. Archer’s biochip design principles include the micro- and nano-fabrication of integrated sensing devices in regions of a chip that work alongside other fabricated functional regions *on the same chip* to process, detect and analyse biological specimens.

Advanced lithography processes performed in a semiconductor foundry are required to fabricate and integrate various features as part of a nanoelectronic device and the work done by Archer to fabricate 15 nm biochip features is an important step in the potential future operation of Archer’s biochip.

[‡] <https://www.nature.com/articles/ncomms12232>

About Archer's biochip

Archer's biochip is lab-on-a-chip technology the Company is developing to enable the complex detection of some of the world's most deadly communicable diseases. The biochip development commenced in Nov 2020 (ASX ann. [5 Nov 2020](#)).

Archer is currently focused on micro- and nano-fabrication of the biochip device components (ASX ann. [31 Mar 2022](#)) and combining these components with biochemical reactions to detect diseases (ASX ann. [1 Dec 2021](#)), which pose significant technological challenges to potentially commercialising lab-on-a-chip devices.

About Archer

Archer is a technology company that operates within the semiconductor industry. The Company is developing and commercialising advanced semiconductor devices, including chips relevant to quantum computing and medical diagnostics.

The Board of Archer authorised this announcement to be given to ASX.

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