

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

22 March 2021

## Archer strengthens biochip nanofabrication capabilities

### Highlights

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- Key biosensor components of Archer's lab-on-a-chip device miniaturised to nano-size chip formats, a requirement for successful biochip development.
  - Archer team grows, introducing world-class expertise and capabilities spanning nanotechnology, advanced materials, and molecular biology.
  - The Company is utilising over \$150 million of sophisticated chip building facilities in Australia to manufacture its graphene-based biochip technology.
  - Lab-on-a-chip devices form part of the multibillion dollar deep-tech economy, catalysed by the global need for point of care medical diagnostics and testing<sup>†,‡</sup>.
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Archer Materials Limited ("Archer", the "Company", "[ASX:AXE](#)") is pleased to provide shareholders with an update on the progress it has achieved as part of its graphene-based lab-on-a-chip device ("A1 Biochip", "biochip") technology development.

### Capability building is a high strategic priority in Archer's biochip development

Recently, Archer announced (ASX ann. [5 Nov 2020](#)) the Company was aiming to miniaturise key biosensor components of its biochip technology (*i.e.* to reduce the size to nanoscale) onto silicon wafers; a technology development milestone required prior to validating commercial advantages of ultra-sensitivity and device integration. Translating the biochip sensor components onto silicon wafers would also enable high volume chip production – required for any future retail applications of the biochip.

The Company has now successfully demonstrated that it can fabricate nanosize biosensor components of 100-150 nanometer features on silicon wafers (Image 1). This is significant, as in [Aug 2020](#), prior to the Company utilising local semiconductor foundry fabrication techniques, it was limited to one sensor per ~1 cm<sup>2</sup>; the Company has now, with its in-house capability, miniaturised key biosensor components to chip-formats on silicon by nanofabrication translating to approx. over 1 million sensor components within a 1 cm<sup>2</sup> area.

### Australia's Modern Manufacturing Strategy Road Map

The sophisticated processes employed by Archer and its collaborators aim to locally manufacture high-value medical diagnostic technology at world-class facilities like the [Research and Prototype Foundry](#), directly aligns to the Australian Government's strategic manufacturing priorities<sup>§</sup>, and facilitates Archer's scale-up in the global semiconductor industry<sup>\*\*</sup>.

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<sup>†</sup> <https://media-publications.bcg.com/BCG-The-Dawn-of-the-Deep-Tech-Ecosystem-Mar-2019.pdf>

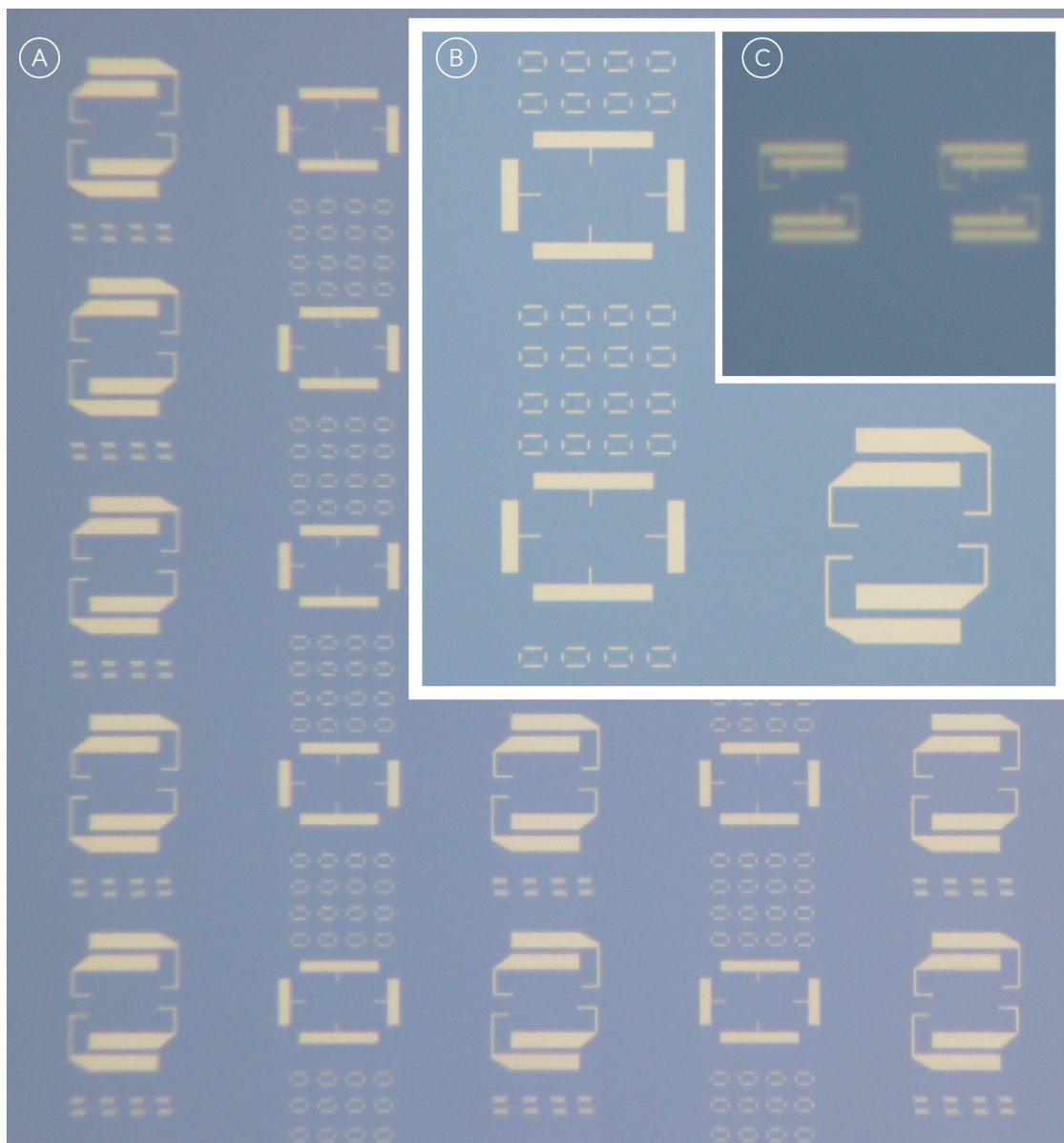
<sup>‡</sup> <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>

<sup>§</sup> <https://www.industry.gov.au/data-and-publications/medical-products-national-manufacturing-priority-road-map/road-map-at-a-glance>

<sup>\*\*</sup> <https://www.chiefscientist.nsw.gov.au/independent-reports/australian-semiconductor-sector-study>

**Commenting on the recent Company growth, Archer CEO Dr Mohammad Choucair said:** “Archer has attracted talented technologists to work on a promising, potential solution to a global challenge that has significant socio-economic implications. As we ramp up our biochip development, we will strategically bridge industry capability gaps, and where possible, locally.”

“At Archer, our staff have a proven track record of producing intellectual property that is worth protecting internationally. As we solve for significant technological barriers in our biochip development, the Company will rapidly translate this knowledge into strong IP assets that would underpin high value, long-term commercialisation”.



**Image 1. Nanofabricated biochip electrode componentry.** A-C Microscope image looking directly down onto a silicon wafer containing patterns of metallic electrodes at various feature sizes down to ca. 100-150 nm, as shown in C, and are only a few hundred atoms ‘thick’, which could be used to connect to single and few-sheets of graphene (*i.e.* single and few-atoms ‘thick’). This would allow the creation of biosensor componentry on the biochip based on graphene transistors, using Archer’s proprietary intellectual property involving methods to pattern the graphene, new materials, processes, and sensing components the Company is currently developing locally at a world-class [Research and Prototype Foundry](#).

## Archer is ramping up its biochip development quickly and cost-effectively

The Company has recently brought on permanent staff to pursue areas of highest value-added activities in its biochip development, like those reported in this ASX release. Archer's team has grown to include expertise spanning semiconductor device fabrication, nanoscience and technology, advanced materials engineering, and molecular biology.

Cross-functional skills capability now exists within the Archer team, *i.e.* team members are able to contribute to both the biochip and <sup>12</sup>CQ quantum computing chip development. Archer is now able to expand on its commercial access-and-use of some of the best instrumentation in the world to address future biochip development milestones and accelerate commercialisation.

## Lab-on-a-chip devices are a paradigm shift and global opportunity in medical diagnostics

Archer's biochip design principles involve using proprietary graphene-based materials as integrated circuits, to form the key sensing elements in its lab-on-a-chip technology. The biochip end-use is initially aimed at addressing the complex detection of diseases affecting the respiratory system, as they remain the world's most deadly communicable diseases<sup>†,††</sup>.

Lab-on-a-chip devices integrate several biological laboratory functions on a single chip, one being biosensing, and others including [sample delivery](#), for better diagnostics. The largest technological barriers to commercialising such devices involve nanofabrication, like those detailed in this ASX announcement, that link to high-value advanced manufacturing. This is the current focus of Archer in its biochip development, and key outcomes will be lodged to ASX.

## About Archer

A materials technology company developing innovative deep tech in quantum computing, biotechnology, and reliable energy. The Company has strong intellectual property, world-class in-house expertise, a unique materials inventory, and access to Tier 1 technology development infrastructure.

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

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Website:

<https://archerx.com.au/>

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Sign up to our Newsletter:

<http://eepurl.com/dKosXI>

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†† <https://covid19.who.int/>