Safety comes first

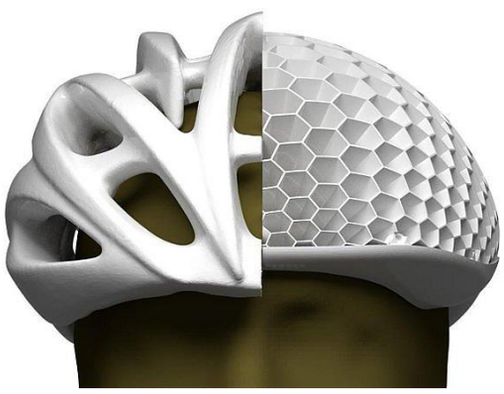
Polymer AM creates ergonomic structures for enhanced safety and performance

HEXR

Hexr have pushed the boundaries of helmet design, with a vision of producing one that performs better than any other in the world and helps save lives by combining innovative honeycomb structures with polymer additive manufacturing.

> "The only way to make a curved honeycomb structure without distorting the mechanical properties is by 3D printing"
>
> James Cook
> Founder of Hexr

It's a well-known fact that cyclists have suffered the worst head injuries and the most fatalities since the beginning of the 20th century. Early helmets were simply formed of a ring of leather around the head and a wool ring above that. Modern-day helmets have come a very long way not only in terms of aesthetic design, but also a huge focus has been placed on safety and comfort, reducing the number of major injuries and fatalities.



Hexr was founded by James Cook at University College London under the supervision of leading material scientist Prof. Mark Miodownik. Starting their investigations into materials and structures, they realised that cellular structures have the highest crush strength to weight ratio.

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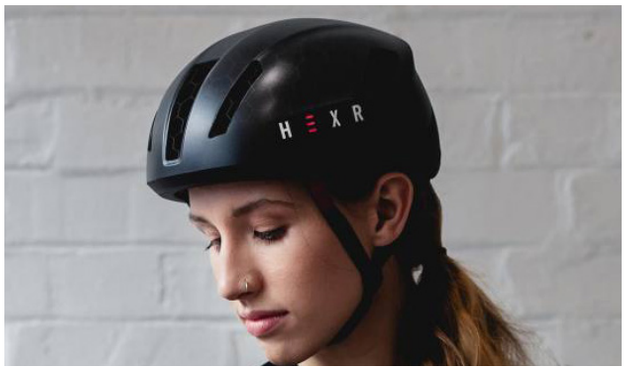
The collaborative nature of the relationship enabled 3T's CAD engineers to assist with the design, making recommendations and improvements to gain the best results from AM. Due to its high impact resistance and elasticity, Polyamide PA11 was used to manufacture the helmet insert, resulting in very positive test results.

PA11 conducts heat 8 times faster than foam. It is made from 100% renewable raw materials using only oil from castor beans. Furthermore, the patent-pending honeycomb structure is 68% better at controlling impact than foam.

The design can be customised without the need for expensive tooling. Every cyclists head is scanned using Hexr's scanning app, creating an accurate 30,000 point 3D mesh in seconds. Algorithms then generate a bespoke inner structure, which is converted into suitable 3D CAD data for polymer printing machines. Parts are built as an exact replica of the CAD design creating ergonomic, bespoke linings for life saving helmets.



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