

Only a small number of athletes will break records and win medals at the Rio 2016 Olympic Games (August 5-21) but all participants tailor their preparations for months (even years) in advance in the hope of peaking at just the right time to take a place in the Olympic spotlight. Behind the scenes, sports clothing and footwear brands and their ingredient-brand suppliers have also been busy preparing their Olympic innovations and are waiting for their chance to shine too.

All roads lead to Rio



It is not just the athletes competing that want the chance to shine at the 2016 Olympic Games. Outdoor and sportswear brands will focus all of their efforts on Rio de Janeiro to try and capitalise on surging interest from the media and general public.

 Under Armour

The rise of sportswear brand Under Armour since its launch in 1995 is a remarkable one. In the first quarter of 2016, the company's net revenues increased by 30% to \$1.05 billion, allowing it to record a twenty-fourth consecutive month of more than 20% revenue growth. Its targets remain ambitious. In September 2015 it announced the goal of revenues of \$7.5 billion by 2018, an achievement requiring growth of 25% per year.

To help it achieve this goal, its sights are trained on this summer's Olympic Games in Rio de Janeiro. A good showing at the Olympics has the potential to help Under Armour keep growing. Founder, Kevin Plank, is in no doubt. He is convinced that the company is "just getting started in becoming the next great global brand".

Land of opportunity

The only sporting event that surpasses the Summer Olympics in terms of revenue and global television audience is the football World Cup. In Rio, as is the case every four years, up for grabs is a bigger share of the international sporting goods market, which is currently estimated to be worth \$270 billion. Under

Armour has much to gain given that only 12% of its total net revenues are currently from outside the US.

Specific to Brazil, it opened 70 stores in Brazil in March 2014, primarily to capitalise on the football World Cup that took place in the country a few months later, but even at that time the 2016 Olympic Games were very much in the minds of the management team. Mr Plank described the move as "a critical step towards reaching our international expansion goals".

Matt Powell, vice president and sporting industry analyst at consultancy group NDP, says that sportswear sales "typically see a lift with the Olympics", but clarifies that this will likely not be seen until 2017 because brands usually only release products and technologies debuted at the Games to consumers later on.

At last count, around 250 athletes will sport the Under Armour logo in training or competition at this summer's Olympics. They will compete in a range of sports including tennis, athletics, gymnastics and golf, which is returning to the Games for the first time in 112 years. It has hedged its bets by sponsoring lesser-known athletes like US sprint athlete Natasha Hastings and US female footballer Kelley O'Hara, as well as global stars such as 2012 tennis gold medallist

Andy Murray and golf sensation Jordan Spieth. It will supply kit for local talent in the form of Brazilian beach volleyball duo Talita Antunes and Larissa Franca and also provide gear for Canada's rugby sevens players and boxers as well as gymnasts from the US.

A big disappointment for the company was the decision of US basketball star Steph Curry to withdraw from his country's squad in order to rest after a busy domestic season. He would have led the brand's footwear push in Rio, having put his name to a hugely popular range of basketball shoes.

Times are changing

Under Armour is likely to benefit from a loosening of the strict advertising rules in place to protect the interests of official Olympic partners and suppliers. Nike has taken over from adidas as an official supplier for 2016 but it will not have the same privileges as sponsors did in previous years after the International Olympic Committee (IOC) modified the so-called "rule 40".

This rule banned non-partner companies from running advertising campaigns featuring Olympic athletes during a "blackout period" lasting from a few days before the Games started until after they had officially finished. The modified rule no longer applies this restriction.

Under Armour has capitalised on the relaxed rules by making swimmer Michael Phelps, who in June became the first US male swimmer to qualify for five Olympic Games, its star recruit. The 18-time gold medallist won't be wearing Under Armour-branded gear during competition in Rio but he uses Under Armour kit for much of his training outside of the pool. He has had a very prominent role in the brand's 'Rule Yourself' marketing campaign in the build-up to the Games and the rule change means the campaign will now be able to run once the competition is under way.

Back in March 2016, the swimmer, who reversed his decision to retire following the 2012 Games in London, attended a presentation at which some of the uniforms that the company's athletes will wear in Rio were unveiled. The event in Baltimore also saw the first screening of his 'Rule Yourself' film. It showed him following an intense training regime ahead of the Olympics and formed part of a "360-degree global campaign", designed to take full advantage of the increased media attention generated by the Games.

The campaign's motto is that "it's what you do in the dark that puts you in the light" and aims to shine a spotlight on the behind-the-scenes training that needs to happen before an athlete can perform to their full potential when the eyes of the world are watching.

Team game

An earlier part of the 'Rule Yourself' campaign in February featured US female gymnasts, who Under Armour has been supporting since 2013. The eight-year kit contract with USA Gymnastics was the first time the brand had sponsored a team competing in the Summer Olympics. The agreement was signed with USA Gymnastics rather than with the individual athletes on the team, meaning that the uniform they wear when they take to the mats in Rio will be branded with the Under Armour logo regardless of whether the individual athlete has a sponsorship deal with another sportswear provider.

The event in Baltimore saw the launch of some of the kit that US gymnasts will be able to call on. It featured strategic compression technology designed to increase blood flow and four-way stretch fabric that will give better mobility in all directions. "We are able to have fabrics that have stretch, move with the body but at the same time are lighter in weight and can take on decoration," says Adam Clement, senior creative director of team sports. The decoration in question comes, as has long been the case for US gymnasts, in the form of a star motif, inspired by the country's flag. Mr Clement has explained that the company is holding some of the designs back "so there is the element of surprise at the Games".

The company has taken a calculated risk by supplying gymnastic kit because it is a sport in which competitors rely so heavily on the performance of their uniform for success. The difficulty of the exercises that medal-winning gymnasts must perfect often puts them at risk of serious injury. Without confidence in their kit, they would not be able to push themselves to the limit and achieve the high scores required to claim a place on the podium.

Under Armour will be hoping that the risk pays off this time after the disappointing results of a similar partnership with the US

Host nation Brazil's track & field stars, including triple jumper Keila Costa (pictured), will wear Nike Vapor kits with AeroSwift technology.

 Nike



speed skating team at the 2014 Winter Olympic Games in Sochi, Russia. Like gymnastics, the winners and losers in speed skating are often separated by the tiniest of margins and uniforms that offer high performance can be the difference between first and second place. The Mach 39 suit that Under Armour provided to US speed skaters in Sochi shouldered much of the blame, whether warranted or not, for the disastrous performance of the country's speed skaters, who failed to win a medal for the first time since the Sarajevo Games of 1984.

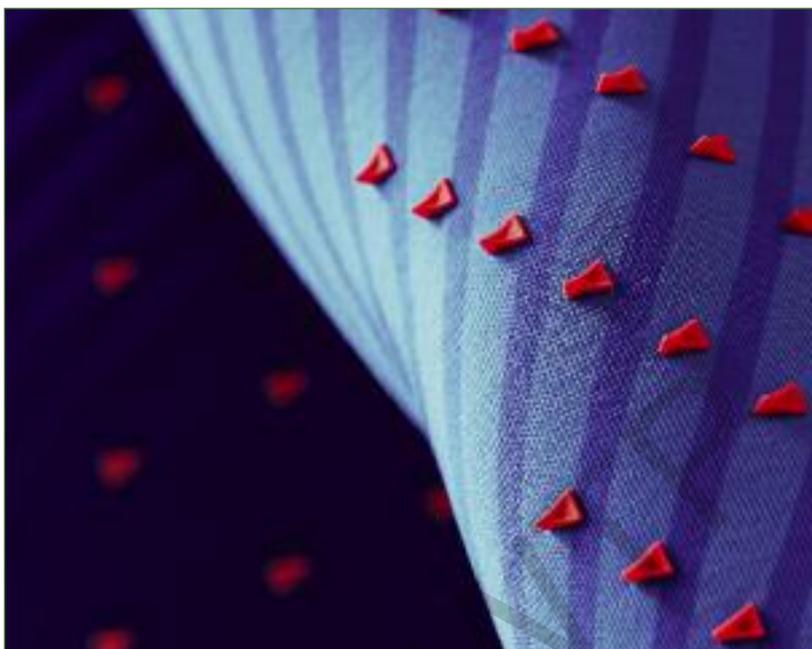
Climate control

Cooling technology will feature heavily in several of the uniforms that Under Armour is supplying for Rio. For its partnership with the US boxing and Canadian rugby sevens team, the company will use its CoolSwitch and ArmourVent technologies, which are designed to draw away heat from the body and increase airflow so athletes can perform at their maximum for as long as possible. The CoolSwitch climate controlling technology helps cool the body and skin using three active cooling agents that have been blended together in a garment for the first time. Each ingredient performs a specific function but it is the combination of the three that means the wearer stays cooler for longer and so can continue to exercise. A coating on the inside of the garment activates as soon as a temperature increase is detected to pull heat away from the skin and make the wearer feel instantly cool. The second agent kicks in when the athlete begins to sweat and stimulates the body's own natural cooling mechanisms. The final element takes its lead from the technology that NASA uses in its spacesuits, absorbing and storing heat energy in the outer "crystal" layer of the garment. This technology will also feature in the tennis kit of world number two Andy Murray.

The ArmourVent technology will be available to US boxers as well as being incorporated into the Under Armour sportswear range for golfer Jordan Spieth, who announced he wouldn't be participating in Rio due to concerns over the Zika virus. The clothing consists of a single-ply layer of stretchy polyester containing lots of small holes to give maximum breathability to the wearer.

Outside the box

As part of a strategy to form a strong connection between the brand and the Games, Under Armour will set up outdoor gyms along a large stretch of beach in the host city. Marketing teams will be in place to promote the brand's products and fans will be able to take part in daily workouts and see what it's like to be an Under Armour athlete. The company also has a penthouse location where VIP guests will be



entertained and given the chance to mingle with some of the brand's star athletes.

The 'Rule Yourself' campaign will obviously be a huge focus during the Games but Under Armour also plans to make considerable promotional efforts on social media. A recent report from investment banking group Goldman Sachs said that a "greater flow of conversation via social media provides athletic brands with even more firepower to authentically reach consumers".

According to the group, the last Olympic Games in London in 2012 saw over 150 million tweets sent from social media site Twitter. With social media even more powerful than four years ago, Under Armour is wise to make it a central feature of its promotional activities, especially given the increased online freedom given to athletes by the changes to "rule 40".

The need for speed

Another prominent brand, Nike, will continue its relentless pursuit of perfecting track & field apparel to give athletes a competitive edge. Its latest offering ahead of the Olympic Games in Rio de Janeiro involves tiny nodes that combat wind resistance and help the wearer maximise performance.

In the wake of the 2012 Olympic Games in London, WSA featured the Nike Pro TurboSpeed suit in a round-up of the stand-out apparel innovations on show. The suit, designed for runners competing in sprint events, featured dimples, similar to those found on golf balls, that helped to improve aerodynamic performance. For the 2016 Games in Rio, Nike has taken the development a step further by incorporating small silicone nodes into its Vapor range of track & field kits.

"At the London Games, we had dots on our

Nike settled on the triangular shape of the AeroBlades after extensive testing of prototypes built using 3D printing technology.



kits, specifically for sprinters, to increase the aerodynamic wave and make the athletes faster," says Michelle Miller, the brand's senior concept designer. "For Rio, through the process of rapid prototyping, we've figured out triangular shapes make the most aerodynamic kit." These triangular fins, which have been dubbed AeroBlades, reduce the drag generated when air passes over and around an athlete's body as they move. They create air channels around the runner, propelling them forward and helping them to run faster. Rapid 3D printing technology allowed the brand to create a range of prototypes, which were extensively tested in wind tunnels, before Nike settled on the design that will feature on the uniforms of athletes from the US, Germany, China and Brazil.

The performance of the Vapor range will be further boosted by Nike's AeroSwift technology, which offers a lightweight, breathable and comfortable kit. It is constructed from knitted fabric that contains yarn made from recycled PET bottles. The four-way stretch knit of the fabric gives the wearer better support and the simplified construction reduces the weight of the kit so that it doesn't negatively impact on the athletes' performance. Garments incorporating Aeroswift technology also have a breathable mesh that is knitted rather than laser-cut. The tiny holes, intended to keep the wearer cool, are precisely knitted in the ideal positions to release heat during exercise.

According to Nike creative director, Martin Lotti, the new knitting technique allows the company to "build breathability right into the garment without compromising its structure".

Nike wants to eliminate all of the potential distractions that could inhibit an athlete's performance (overheating, sweating, discomfort) so that the only thing they have to worry about

is their own performance. "In past years, we had focused on sprinters, but this year we wanted to create an innovation that went across all running disciplines," Ken Black, Nike vice-president of digital design future, explains.

The Aeroblades will be knitted into the arms, legs and chest of each Vapor track & field kit, offering what the brand says is the "greatest drag reduction of any Nike track and field kit to date". The silicone nodes will be clustered on the vest, shorts and sock to target the areas of the body most affected by wind resistance when an athlete is in full flight. They will be able to choose between one-piece running uniforms or two-piece outfits and there will be optional forearm and calf sleeves with strategically placed AeroBlades for even better aerodynamic efficiency.

"The forearms and the lower legs move twice as fast through the air than the rest of the body, so that's why the concentration of Aeroblades is much higher in those areas," says Mr Lotti.

Other disciplines

Away from the Engenhão stadium, the main venue for athletics, careful preparatory work has gone on to help athletes in other disciplines win medals too.

Italian bicycle wheel and tyre manufacturer Vittoria says it is expecting riders using its new graphene-enabled range of tyres to win gold in a number of the 18 cycling events that will take place at four locations in and around Rio. Working with technology provider Directa Plus, Vittoria has developed a range of tyres that use a graphene compound called G+ Isotech. It launched the new tyres at cycling exhibitions last autumn and a number of cycling teams have already signed up during 2016 to use the equipment. For example, three teams (Team



Vittoria Industries believes its graphene-enhanced wheels and tyres will boost cyclists' medal hopes in Rio.

 Vittoria Industries



Having won gold at the Beijing and London Olympics, Dutch swimmer Ranomi Kromowidjojo is aiming for a hat-trick in Rio.

 Arena

Giant-Alpecin, Team Lotto NL-Jumbo and Bora-Argon 18) have used Vittoria's graphene-enhanced tyres at this year's Tour de France and individual athletes and national teams are preparing to use them in Rio.

Vittoria chief executive, Rudie Campagne, says graphene has enabled his company to develop "intelligent", durable, puncture-resistant tyres that become harder when rolling straight and softer when the rider brakes or takes a corner, therefore offering extra speed and extra grip exactly when required. "Graphene is a dream come true for us," Mr Campagne said.

He adds that independent tests in a laboratory in Finland have shown Vittoria's G+ Isotech tyres to offer a 32-second advantage over a distance of 50 kilometres, compared to tyres previously recognised as leading the market. Rudie Campagne says: "If you think that the Tour de France can be won by just a few seconds after three weeks, 32 seconds after 50 kilometres is an enormous advantage. Gold medals at the Olympics will still depend on the riders' strength and skill, but we are certainly going to give them all the help they need. We started making prototypes in 2014 and sent them to cyclists in New Zealand, Brazil, Finland, the US, Italy, Portugal and Australia. People were amazed; they really felt the difference. They were used to speed meaning losing grip and vice-versa and we have changed that. Now you can have speed and increased grip at the same time."

Suit controversies fresh in swimmers' minds

In time for the action in the Olympic Aquatics Stadium in Barra da Tijuca, in the western part of Rio, Italian swimwear brand Arena has launched the latest suit in its Powerskin Carbon range, the Powerskin Carbon-Ultra. It presented the new suit at an event in London during the 2016

European Aquatics Championships in May and said swimmers including Sharon van Rouwendaal and Ranomi Kromowidjojo from the Netherlands, and Francesca Halsall and Adam Peaty from the UK, will wear the suit in Rio in August.

Comments from Ms Halsall suggest the controversy surrounding swimsuits following the Olympic Games in Beijing in 2008 is still fresh in competitors' minds. She has been with Arena for seven years and hopes to remain with the brand for years to come. "The suits are fantastic," she says, but adds that, as well as high levels of functionality, swimmers need to have confidence that the suits they wear will bring no repeat of earlier controversies.

Swimming's governing body, FINA (Fédération Internationale de Natation) initially approved swimwear such as Speedo's LZR line of so-called 'supersuits', made from an ultra lightweight, water-repellent material. At the 2008 Games, 94% of all swimming races won were won by competitors wearing these suits and 23 of the 25 world records broken at the Games were achieved by swimmers competing in it. Other brands moved as quickly as they could to emulate the LZR's capacity to limit passive drag in the pool and, amid further protests, athletes went on to set 17



The Ultra, the fourth suit in Arena's Powerskin Carbon series, houses three technology innovations in its inner layer.

 Arena

new world records at the 2008 European Short Course Swimming Championships in Rijeka in Croatia. At that point, FINA decided it had to take action.

After breaking the world record again in June 2009 wearing a similar suit called the adidas Hydrofoil, German 100-metre freestyle specialist Britta Steffen said the suit made her feel like a speedboat in the water. "Never in my life would I have believed a human could glide like that," she said. "You don't die in the last metres and you feel no pain. Under normal circumstances, this suit should be forbidden." Within weeks of her comment, this prophecy came true.

A big year for suits

Recalling these times, Francesca Halsall says: "That was the year I joined Arena, 2009. It was a big year for suits. And after that, you just wanted to be sure you were with the right manufacturer."

Innovia consultant Rob Moir agrees. A Cambridge-based "interdisciplinary consultancy" (its team comprises designers, scientists and even psychologists), Innovia, worked with Arena on the development of the Powerskin Carbon-Ultra. "We worked hard after 2009," Mr Moir says. "The controversy over the supersuits dragged the limelight away from the swimmers. Athletes were not getting the credit they deserved because all the credit was going to the suit."

Arena introduced the Powerskin Carbon series in 2012, with the integration of a carbon fibre cage into the suit's woven fabric as the main innovation. The Ultra is the fourth suit in the series, but Arena has made it clear that earlier versions, the Pro, the Flex and the Air, are still available for any swimmer who prefers them.

Innovation in the inner layer

Key benefits that the Italian brand believes the newest suit offers are three technology innovations housed in the inner layer. The first of these, Infinity-Loop, consists of tape that supports the key muscle chains swimmers depend on most. Then there is X-Pivot, a feature that delivers "intelligent compression" and anatomical support without restricting a swimmer's freedom of movement. Lastly, there are ultra compression panels to provide additional compression on the inside of the suit to give extra support, streamline body shape, reduce drag and minimise water resistance.

The Powerskin Ultra is made from fabric with three times more carbon fibre content than earlier versions, says Greg Steyger, who works on R&D and brand development for Arena. The material has greater vertical stretch than horizontal, a phenomenon called anisotropic stretch, to make sure swimmers feel no constraints when they reach out as part of their natural stroke. "No two swimmers are alike," he explains. "Their body shapes, their body morphology and their strokes are all different. What we can influence is their body control." He says Arena's sponsored athletes are "our most important resource", the people who have the greatest influence on the development of the new suit through their feedback.

Arena chief executive, Cristiano Portas, says: "Our swimmers get a bit of the spotlight every four years at the Olympics, but they work hard all the time; they are the hardest-working people I know. Hundredths of seconds can make all the difference, and new technology, new material and new fit can all help them." 

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