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WSA

NCE & SPORTS MATERIALS

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Fabrics frame start-up's policy

Wood-free cellulosic fibres

Polartec at 30

THE INTERNATIONAL MAGAZINE FOR PERFORMANCE & SPORTS MATERIALS

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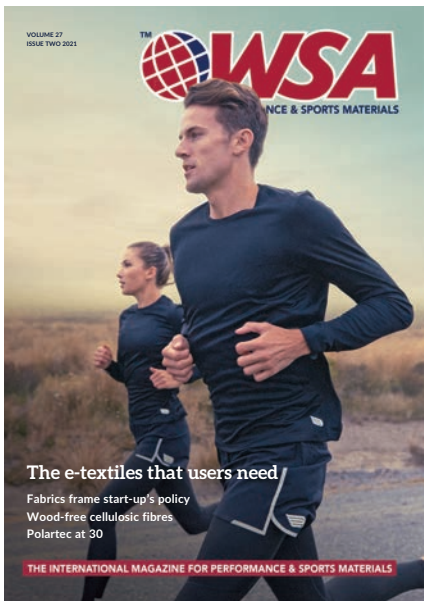

Front cover: Start-up running and compression clothing brand Pressio wants to build its reputation on three pillars: performance, sustainability and transparency. IMAGE: PRESSIO

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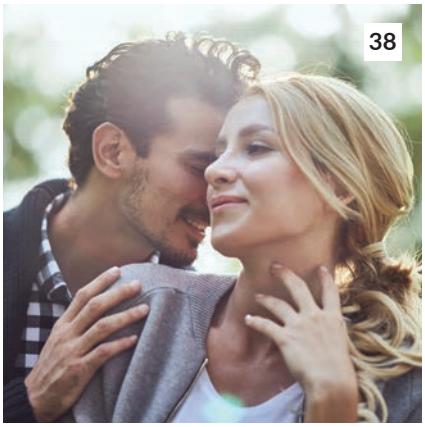

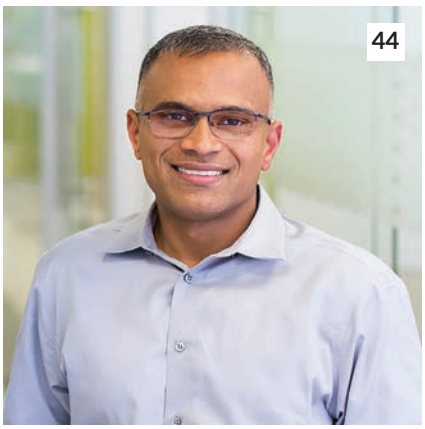

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Global news

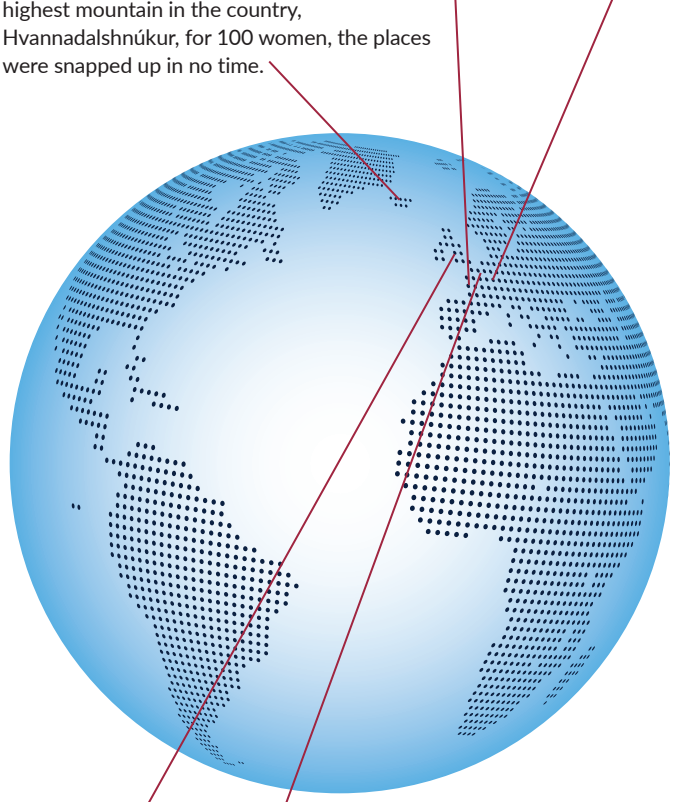
France Linpossible, a project set up by a group of companies to reintroduce linen and hemp spinning in France, will aim to produce 350 tonnes of yarn per year. Dry spinning will take place at Emanuel Lang in Alsace, while Safilin will carry out wet spinning in the north-west of the country. In recent comments about the project, Safilin president, Olivier Guillaume, said his company intended to create 30 new jobs for Linpossible before the end of 2021 and, after that, to employ a further 20 people over a period of three years.

Iceland Iceland outdoor brand 66° North supported a sell-out event on May 1 that cancer survivor Sirrý Ágústsdóttir organised. During her battle with cancer, Ms Ágústsdóttir developed a love of hiking in the mountains of Iceland. She decided to encourage more women to take to the outdoors and began organising events to raise money for two charities. When she announced a hike up the highest mountain in the country, Hvannadalshnúkur, for 100 women, the places were snapped up in no time.

Germany Polymer manufacturer Covestro has said innovative technologies for chemical recycling will be "the only way to recycle plastic waste on a truly relevant scale and with real greenhouse gas savings". It said it wants to be a pioneer in developing and using these innovative recycling technologies. An initial project involves the chemical recycling of flexible polyurethane foam from mattresses.

Switzerland A London-based private equity company Telemos Capital is to acquire Swiss outdoor brand Mammut. Subject to obtaining all necessary regulatory approvals, it said it expected to close the acquisition by mid-2021. It said it had been attracted to Mammut by "its leading premium brand positioning in the growing global outdoor market". Telemos said it viewed Mammut as combining "high technical expertise, functionality and performance with appealing contemporary design".

Italy Polyamide polymers group Radici has announced that it will take part in a project called Monitor for Circular Fashion that management school Bocconi has launched. The initiative aims to establish a plan for integrating circularity in fashion and to develop new circular economy solutions through the sharing of best practice, with the goal of making fashion more sustainable.



Belgium Textiles finishing group Devan has teamed up with technology provider Jeanologia to analyse the water needed when applying its products. The Belgian and Spanish companies studied the application of the products through Jeanologia's e-Flow technology, which can help to reduce water and produces zero discharge. It lowers the cost of application, reduces water and ensures that the correct amount of chemistry stays in the garment, the companies said.

Poland Retail group JD Sports has entered into a conditional agreement to acquire a 60% share of Marketing Investment Group (MIG), a retailer of sports footwear, apparel and accessories based in Poland. Brothers Andrzej and Zbigniew Grzaka founded MIG in Krakow in 1989. It has grown to have a network of 410 stores and associated websites across nine countries in central and eastern Europe. Its stores operate under a number of names, including Sizeer and 50 Style.

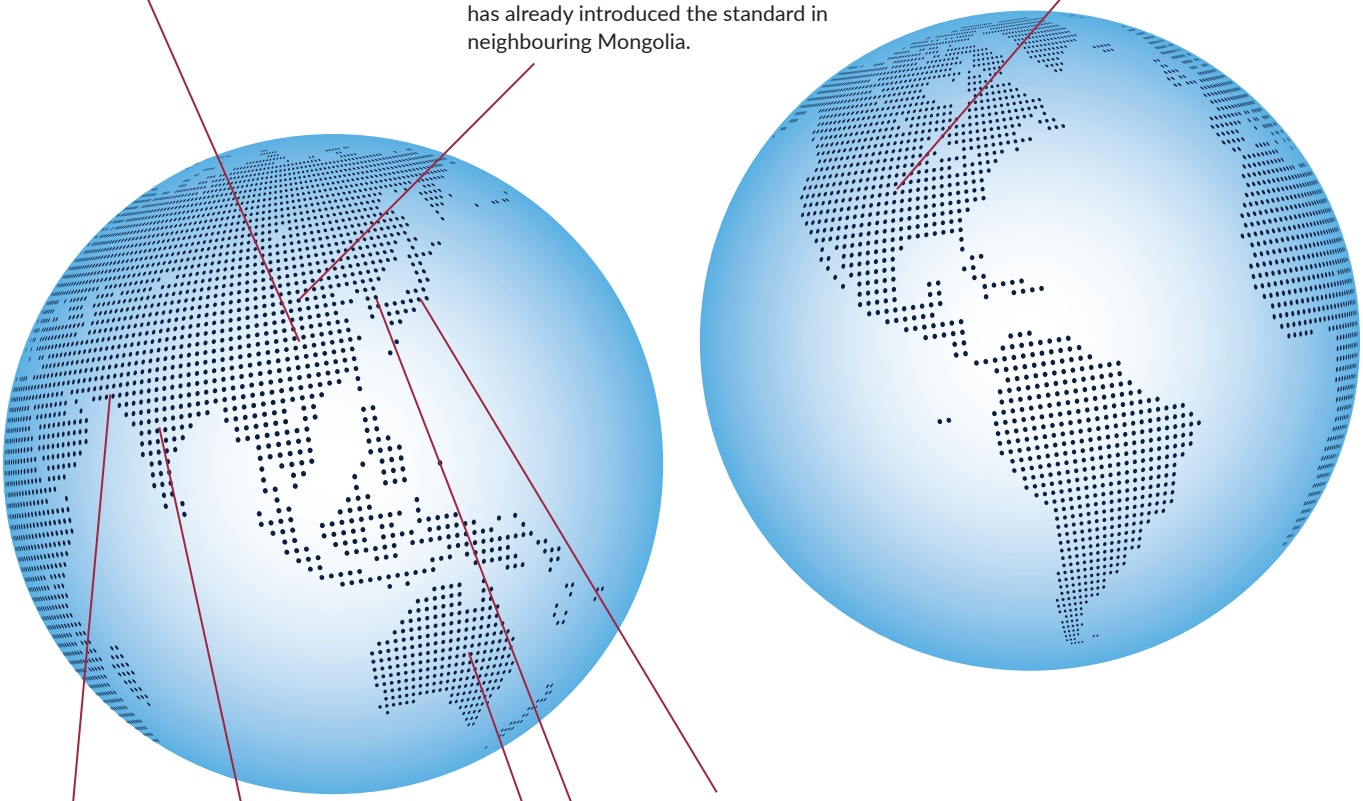
UK Sports retail group JD Sports has published its full-year results for the 12 months ending January 30, 2021. Its revenues were up by 0.9% to a little under £6.2 billion, while its pre-tax profit was down by 7% to £324 million. It said that this "significant retention of sales and profitability" through an unprecedented period of global uncertainty and multiple periods of temporary store closures reflected the strength of the JD brand, the relevance of its product offer to consumers, the agility of the "multichannel eco-system" it has built up over a number of years and the flexibility of its infrastructure.

Ivory Coast French economy minister, Bruno Le Maire, has announced plans to help accelerate and develop sustainable cotton production in Ivory Coast. The country's development agency will invest €68.5 million over the next five years in the project. Mr Le Maire said the investment will be targeted at 120,000 cotton farmers in the West African country's northern region. The Ivorian agriculture ministry forecasts cotton production of 500,000 tonnes for the 2020/21 season.

China Plans for Weilai Cotton (meaning future cotton) have progressed recently. Initiated by Beijing-based Zhongnong Guoji two years ago, Weilai reportedly received a significant boost earlier this year when China Fashion Association and Modern Seeds Development Fund, both state-backed organisations, joined its ranks. It has 32 companies from the Xinjiang Uyghur Autonomous Region (XUAR), plus a number of domestic fashion brands among its members.

Mongolia Retail group John Lewis has announced it will fund a three-year programme run by a group called the Sustainable Fibre Alliance (SFA). SFA is working to secure acceptance in Inner Mongolia, an autonomous region of China, for a new cashmere standard it has set up. It has already introduced the standard in neighbouring Mongolia.

US Brand valuation consultancy Brand Finance has named the world's top 50 apparel brands by value. The London-based consultancy calculates brand value as the net economic benefit that any brand owner would achieve by licensing the brand in the open market. Nike retained the title of the world's most valuable apparel brand for the seventh consecutive year, despite recording a 13% drop in value year on year to reach $30.4 billion.



Japan Fibre manufacturer Teijin has developed technology to mass produce a new version of its Nanofront ultra-fine polyester. The Japanese company has described Nanofront as the world's first nanofibre to be made from recycled polyester raw materials. It also said that the new technology it has developed will enable it to produce all of its polyester fibre products with recycled raw materials.

India Teijin Frontier, the Teijin Group company devoted to fibres and textiles, has set up a new subsidiary in India. Gurugram in the northern state of Haryana will be the base for the Teijin Frontier India, which started this April. The group said high-performance textiles was one of the sectors in which it expected India to be a key player in terms of both supply and consumption in the coming years.

South Korea Seoul-based outdoor brand BlackYak recently unveiled Plustic (a portmanteau of the words plus and plastic), a new collection of garments derived from K-rPET. The initial run includes T-shirts, jackets and trousers, which, depending on the kind of garment, incorporate at least fifteen 500-mililitre recycled PET bottles collected in South Korea.

Pakistan Following reports that Pakistan would allow some imports of cotton from India, the government has said this will not be the case. Pakistan's Economic Coordination Committee recommended that imports resume from June, but the idea was then rejected by the cabinet. Pakistan imposed bans on products from India in 2019 over disputes about Kashmir.

Australia The University of Adelaide's Bianca Agenbag is the 2021 recipient of the Australian Wool Innovation (AWI) Award. AWI presents this award each year as part of Australia's Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry. These awards are open to Australians aged between 18-35 who deliver scientific research for the benefit of agriculture. Bianca Agenbag's award for 2021 is for a project that aims to fill a significant knowledge gap in the early development of lambs by focusing on colostrum.

People

A leg up for designers

VF Corp brands Timberland, Vans and The North Face are backing a footwear design course run by the Pensole Academy that will provide access to professional design experience for Black, Indigenous and People of Colour (BIPOC) students.

The DiverCity x DESIGN curriculum will equip students with footwear design principles, hands-on experience, professional development training and brand engagement. Top-performing students will win internships at the brands.

Pensole founder **D'Wayne Edwards** said: "DiverCity x DESIGN is an amazing opportunity to reach consumers where they are and provide them pathway into our industry."

Chris McGrath, vice-president of footwear design at Timberland, said aspiring designers would gain insight and experience and that it would prepare them for a lifelong career.

Green economy

The chief executive of yarn producer Aquafil, **Giulio Bonazzi**, was one of the speakers at an online event called 'The green economy in Trentino' in April. Organisers said they wanted to highlight the province's success in encouraging sustainable development. Aquafil has its global headquarters and three production plants in Trentino. Giulio Bonazzi said ahead of the event that he would use the opportunity to talk about the leadership Aquafil has shown in researching new production models.

FESI figure mourned

The European Sporting Goods Industry Federation (FESI) has announced its former president and a longstanding Puma executive has died aged 80. **Horst Widmann** was president of FESI for 10 years from 2004 and worked at Puma for 27 years. **Neil Narriman**, FESI president and Puma general counsel, said: "No one really believed he would ever retire, which he only did when he was nearly 77 years old.

Boots for sale

A game-worn pair of adidas football boots, worn by **Lionel Messi** to score a record-setting goal in December, have gone on sale at auction house Christie's. The money raised will help fund art and health programmes in Barcelona.

First Arc'teryx design ambassador

Canadian technical outdoor brand Arc'teryx has named New York-based creative **Nicole McLaughlin** as its first ever design ambassador. Ms McLaughlin, who currently has more than 620,000 followers on Instagram alone, is known for her green-minded, innovative approach to upcycling and repurposing materials into fashion articles.

As part of her new role, she will lead a series of public-facing seminars, beginning this autumn with an upcycling workshop. Commenting on her appointment, Ms McLaughlin said: "As a climber and designer, I'm excited to partner with Arc'teryx. I am looking forward to shared learnings and connecting our communities so that together we can amplify the value of circularity, including repurposing garments to keep waste out of landfills."

Make Fashion Circular lead to step down

Francois Souchet, who leads the Make Fashion Circular programme at campaign group the Ellen MacArthur Foundation, has announced that he is stepping down.

His successor will be **Laura Balmond**, who has also worked at the Foundation for the last five years, first as a project manager and, since the start of 2020, as the programme manager on Make Fashion Circular.

"What a journey it has been," said Mr Souchet on LinkedIn, "starting in 2016, when I was supporting the Ellen MacArthur Foundation's strategic partners in better understanding the opportunity of circular economy. Then in 2018, I moved to initiate Make Fashion Circular, which has been a thrilling ride since day one and led to so many exciting projects."

Berghaus switch for Rapha director

UK outdoor group Pentland Brands has appointed **Charlie Pym** as the global brand director for Berghaus. He joins from the world of cycling, having been the marketing director of McLaren's Pro Cycling programme and the director of communications at Rapha.

Mr Pym has also been a managing partner at advertising group at Saatchi & Saatchi. He said: "I'm passionate about the outdoors and feel incredibly lucky to have a role that will inspire more people to see and feel the wonder that sits beyond their front door."

Brand president for Timberland

Timberland has chosen the former CEO of clothing brand NIC+ZOE as its brand president. **Susie Mulder**'s responsibilities include product diversification across footwear and apparel and she will report to **Steve Rendle**, chairman of Timberland's parent group, VF Corp. Before serving as CEO of Nic+Zoe, Ms Mulder was a partner at global management consulting firm McKinsey & Company where she was a leader in the global retail and consumer goods practice.

Clarks deal complete: Li Ning involved

Hong Kong-based private equity firm LionRock Capital has confirmed the completion of its "partnership" with footwear group Clarks, announced towards the end of 2020. LionRock Capital will acquire a majority stake in the business for an investment of £100 million.

It announced that **Víctor Herrero** has taken over as chief executive of Clarks, replacing **Giorgio Presca**. Mr Herrero was formerly chief executive of Guess and, before that, held several senior roles at Inditex, including the position of head of Asia Pacific and managing director for China.

Since LionRock's initial announcement in November, former Olympic gymnast and entrepreneur **Li Ning** has acquired a 51% stake in LionRock and is now its non-executive chairman. Mr Li's own-name sports brand achieved revenues of $2.1 billion in 2019 and currently has a network of nearly 7,000 stores across China.

On the completion of LionRock's acquisition of a majority stake in Clarks, Li Ning said: "I am thrilled that LionRock Capital is partnering with one of the UK's most iconic brands during this momentous new phase for the business. We look forward to leveraging our network and experience to support Clarks through the next phase of development."

Europe leadership for VF

VF Corporation has announced four senior appointments in its European team. **Andreas Olsson** has been appointed regional general manager for Dickies; **Massimo Ferrucci** has been named president of Napapijri in addition to his role of general manager for emerging markets; **Argu Secilmis** has been chosen as vice-president of product and marketing at Napapijri; and **Stuart Pond** has been appointed vice-president of supply chain operations.

Martino Scabbia Guerrini, VF's president for the region, said: "VF's ongoing success in Europe is driven by a strong, cohesive leadership team with extensive business management experience, industry knowledge and a deep understanding of our company culture and vision."

Timo Schmidt-Eisenhart, formerly Napapijri's president, has left to pursue a new career opportunity.

Woolmark announces performance challenge winners

The Woolmark Company, a promotions body for Australian merino wool, has announced the three winners (out of 352 entrants) of its 2020 performance challenge, which invited early-career creatives to develop forward-thinking ideas. for ocean racing, with a particular emphasis on ocean plastic pollution.

Woolmark's 2020 competition partner was technical clothing brand Helly Hansen.

Carly Conduff won a three-month internship with Helly Hansen, **Bettina Blomstedt** a three-month internship with The Woolmark Company and **Younghwan Kim** received a €10,000 research bursary to enable the continued development of his entry idea.

Entries are now open for the 2021 prize, which will run in partnership with On and Salewa.

Joint CEOs for Lycra

Lycra's chairman, **Yafu Qiu**, and chief commercial officer, **Julien Born**, will jointly take the role of CEO following the retirement of **David Trerotola**. The pair will use different aspects of their experience to "better implement the new development plan and bring greater operational focus".

Industry & Innovation

Innovators selected

The Fashion For Good initiative, which aims to help companies in the fashion supply chain work with innovative technology providers to make clothes more sustainable, has selected ten companies to participate in its South Asia Innovation Programme.

This is the third batch of textile technology providers that the Amsterdam-based organisation has selected for the programme. This cohort includes innovators from eight countries, adding Malaysia, Singapore and Indonesia to the roster. The new batch includes technologies producing biopolymers from locally sourced feedstocks like jute and cassava, which Fashion For Good describes as available in abundance and having the potential to be "feasible alternatives to plastic".

Other new technologies include inks produced from greenhouse gas emissions, innovations in dyeing and finishing, dyes from waste from the tea industry, inspection technologies and innovations in wastewater. The innovators will receive support from Fashion for Good throughout the nine-month programme. They will also work closely with the organisation's network of global partners on pilot projects and implementation activities, developing their path to scale up their technologies.

Consortium to scale up polyester recycling

Japanese groups Teijin Limited, JGC Holdings Corporation and Itochu Corporation have signed a joint agreement on developing polyester chemical recycling technology from discarded polyester textile products.

They said: "In the fibre and textile industry, there is an urgent need to address sustainability issues such as the mass disposal of clothing as well as high levels of CO_2 emitted during manufacturing."

This agreement will bring together Teijin's proprietary chemical recycling technology, the engineering expertise of JGC and Itochu's textile industry partnerships. The three groups intend to establish a system for collecting discarded polyester fibre products and set up chemical recycling technology for using these as raw materials. Itochu is working with Lycra on its Coolmax EcoMade and Thermolite EcoMade made from 100% textiles waste.

Repurposed airbags

Seoul-based fashion brand Kanghyuk, a semi-finalist of the 2019 LVMH Prize, has created a skiwear-inspired collection that incorporates repurposed airbags donated by South Korea's Hyosung Advanced Materials. The airbags, which could not be used by Hyosung owing to their dimensions not meeting specifications, can be used to make around 700 jackets.

Kanghyuk has previously collaborated with Reebok on sports shoes made from surplus materials from earlier Kanghyuk collections. The brand will incorporate Hyosung's regen fibre in future designs.

Breakdown service

Nylon 6.6 specialist Nilit has developed a nylon fibre enhanced with a technology that means the fibre breaks down faster than conventional nylon. The company says this will reduce the persistence of textile waste in sea water and in landfills when the garment reaches the end of its life. Independent tests, simulating seawater and landfill soil environments, showed Sensil BioCare as having "remarkable disintegration".

Recycled down alternative

Insulation developer PrimaLoft recently launched a more sustainability-focused version of its ThermoPlume down alternative, first released in 2017. Created from 100% post-consumer recycled material, the synthetic product is made up of small fibre "plumes" that, according to the company, collectively mimic the fluidity, hand-feel and aesthetics of down.

Swiss sunshine

Solar panels installed by Swiss performance textiles specialist Schoeller Textil have generated 10% more energy than predicted in the first year of operation. More than 2,838 solar modules at its production facility in Sevelen produced 950,000 kWh of energy. The Swiss group used 85% of this to power its plant and fed the remainder back into the grid.

Carbon-saving zips

Zip manufacturer Riri Group has committed to using only recycled polyester for its tapes. The recycled polyester will be 20% pre-consumer and 80% post-consumer waste. It has calculated that this will reduce emissions by 32% and the carbon footprint will be cut by 3% for zip production, or 460,000 kg of CO_2 per year.

Made in Sweden

Outdoor brand Woolpower has announced that it will build a new factory in Östersund in central Sweden to meet growing demand for its wool apparel. Construction of the new factory will begin immediately. It will cover 100,000 square-metres, twice the size of the existing production facility that the company has in the town, and will come on stream in spring next year.

Additives in demand

Clariant is to open a dedicated research and development centre for additives at its campus in Shanghai. It said its aim was to bring faster lead-times and more speed in the development of fibres, adhesives, coatings, inks and other products. It will also offer customers opportunities for joint development and application testing.

Head of Clariant's additives business, François Bleger, said that demand for high-end additives was growing strongly in China. He said: "As local manufacturers develop more sophisticated processes, technologies and products to align with market needs and China's environmental goals, sustainable additives can be key to boosting progress effectively and efficiently."

Toe care

Functional footwear brand Joe Nimble has successfully launched a 'recovery sandal' following a crowdfunding exercise. It developed the product in the second half of 2020 and started shipping it to customers this April.

Called 'recoverToes', Joe Nimble says the sandals can help "rehabilitate tired feet after exercise". The design uses polyurethane to work like braces do on teeth, the company said. This involves the alignment of the big toes with a special footbed that spaces out the other toes to improve foot shape and structure, ease plantar pressure and stimulate foot nerve endings to improve circulation.

It worked with researchers at Footwear Innovation Lab in Germany and with polyurethane technology provider Huntsman to perfect the idea. It uses Huntsman's Daltoped polyurethane footwear system technology.

Daltoped Aqua PUR, a low-density polyurethane, makes the soft inner part of the sandal. For the outer surface, Huntsman and Footwear Innovation Lab adapted a Daltoped grip grade to work with a concept called the Stemma RPU spray. This system allows complex bottom designs to be realised without having to worry about potential air bubbles, Huntsman said.

Anti-waste electronic textiles

A research team from Gothenburg's Chalmers University of Technology has developed a cellulosic, electrically conductive thread by using non-toxic, renewable and natural materials during the production process.

A doctoral student involved in the project, Sozan Darabi, said: "Miniature, wearable, electronic gadgets are ever more common in our daily lives. But currently, they often depend on rare and sometimes toxic materials. They are also leading to a gradual build-up of great mountains of electronic waste. There is a real need for organic, renewable materials for use in electronic textiles."

Aerogel insulates insoles

Insole provider OrthoLite has developed a thermal technology that traps aerogel in an open-cell PU foam. The US company said O-Therm will keep feet warmer in cold conditions.

Rob Falken, vice-president of innovation at OrthoLite, said: "Our advanced aerogel traps micro-pockets of air without the need for loft, and it won't lose its effectiveness when compressed under foot. The nano-porous inside of a multi-porous structure creates a thermal barrier which blocks both cold and heat. "O-Therm's advanced silica aerogel powder weighs in at only three times the weight of air."

O-Therm is a 2mm base layer foam that can be combined with top-layer foams to create insoles for categories such as outdoor, casual, work, ski and snowboard.

Anchored in Gällstad

A retro ski sweater collection based on the styles of the 1980s is one of a series of small-scale celebratory clothing collections that Swedish outdoor clothing brand Ivanhoe will release this year to celebrate its seventy-fifth anniversary. Founded in Gällstad in 1946 by Martin Göthager, the company is still run by his family. Its focus is on technical garments knitted almost entirely from wool. Approximately 90% of Ivanhoe garments are still knitted in Gällstad, a small town in the south-west of the country.

Deal boosts enzymatic recycling

French 'green chemistry' company Carbios, which is pioneering enzymatic solutions to recycle plastic and textile polymers, has signed a deal with a "significant PET producer" and might build a plant within its facilities. Carbios is targeting annual production of 40,000 tonnes of recycled PET.

Garment ambition

Lycra's global sustainability director, Jean Hegedus, has said the company will look to use post-consumer as well as pre-consumer waste as raw material. She said that using garments is complicated, but that Lycra hopes to be able use them to make recycled fibres in two or three years' time.

Student grants

UK brands and retailers with excess stock and materials are pooling together to donate fabrics to fashion students, to reduce waste while helping the young designers. Twenty-four brands have joined The British Fashion Council (BFC)'s Student Fabric Initiative so far, donating material to 33 colleges.

Prototypes ripe

Adidas has said it is preparing to unveil two new prototypes with Parley for the Oceans. The first features a midsole that is made in part with recycled Boost energy-return material left over from production of other adidas shoes. The second new shoe contains wood waste in the upper and another Boost midsole concept, partially made with plant-based feedstocks. Adidas said it had used "new exploratory design processes" to create these two prototypes as part of a quest to find alternatives to using virgin polyester.

Open carbon footprint tool

Clothing and footwear firm Allbirds has open sourced its carbon footprint calculator, making it available to competitors and the general public in the interest of ameliorating climate change. "If competition got us into this mess, perhaps collaboration can get us out," Allbirds said on its website.

Colourful waste

Gymwear brand Lululemon has launched a collection of garments dyed with the waste from oranges, beets and saw palmetto trees. The Earth Dye collection follows the introduction of solution-dyed nylon, as well as recycled polyester and FSC-certified rubber materials.

Backtrack

Limitations on space make it impossible for us to run more than a carefully selected sample of industry news in *WSA*. However, we publish hundreds more stories on www.sportstextiles.com, one of the most comprehensive archives of news anywhere on the web for textiles, apparel, footwear and equipment for sports and outdoor. Below are just some of the headlines that have appeared on the site in recent weeks.

06.05.2021

Sustainable swimwear collection from O'Neill

Cotton research heads into space

05.05.2021

Strong recovery in the fibre markets, Lenzing says

Under Armour ready 'to get back on offense'

Eurojersey's latest collection includes wind and waterproof coatings

04.05.2021

Performance Days names award winners

30.04.2021

Strong quarter for BASF

Unifi: Demand for recycled fibres will remain strong

Confident Columbia CEO praises operations staff

29.04.2021

Babolat makes limited-edition bag for Rafael Nadal Foundation

VF Corp offloads part of work segment

Covid exercising leads to record quarter for Skechers

28.04.2021

AI-driven football boots accelerate

Boot brand chooses PrimaLoft PURE

Growth across all categories for Puma in Q1

Aqualung designs 'eco-friendly' wetsuit collection

27.04.2021

Brands line up behind polyester challenge

ViralOff helps Polygiene increase revenues in 2020

New Balance's MADE Responsibly 998s handmade with surplus materials

26.04.2021

New version of Naia on offer from Eastman

Adidas unveils recycled Terrex Futurecraft.Loop anorak prototype

23.04.2021

'Strange things': Functional Clothing Lab's DIY techwear

Asia and Americas boost for Moncler, Stone Island deal complete

22.04.2021

Latest sustainability report shows progress from Elevate Textiles

The North Face's new, no-compromise vision

21.04.2021

Chemical launches K-rWEAR, expands K-rPET

Vans commits to 'responsible' materials

EOCA chooses Earth Day focus for fundraising

20.04.2021

PrimaLoft and Origin partner for 'carbon-negative' insulation

Anta recreates Beijing 2022 gear launch at Jinjiang sports and footwear expo

Plan for new headquarters in place for Under Armour

19.04.2021

Birla Cellulose's Liva Reviva praised by UN GCNI

Functionality and performance in Puma-Porsche Design collection

16.04.2021

Nike Air Yeezy 1 prototypes expected to fetch $1 million

Ralph Lauren's Team USA uniforms highlight new dye technique

EC-backed project to raise awareness of fast-fashion impacts

15.04.2021

Graphene footwear brand opens first shop

Munich event moves to October

Lenzing's new facilities key to climate neutrality

BlackYak free hiking boot rental pilot targets non-Koreans

14.04.2021

Aquafil's Econyl informs Kolon Nylon by Kolon Sport

Team Korea's 'K-Eco-Tech' Olympic uniforms ready for Tokyo

13.04.2021

Nike: Returned shoes cleaned up and knocked down

Under Armour commits to renewable energy

12.04.2021

Eurojersey and WWF Italy enter new stage of eco-sustainability

South Korea's Huvis leads with graphene fibre

Arc'teryx shop-in-shop opens in Lake District

Raw material prices are on the rise

09.04.2021

Hyosung, Pleatsmama set sail with Regen Ocean

08.04.2021

Vollebak partners Polartec for 100 year sweatshirt

Textiles 2030 Roadmap to steer companies towards circularity

07.04.2021

Rockport walks with purpose into its fiftieth year

DSM completes sale of functional materials business to Covestro

VF invests in state-of-the-art distribution centre

Textile Exchange seeks feedback on recycling standards

06.04.2021

Revenues down at H&M but use of sustainable materials up

01.04.2021

Shoe launch from Asics will benefit cadence and stride runners

Gore adapts to pandemic with virtual lab tours

After some 20 years of gestation, the technical challenge of integrating electronic components into clothing has been largely overcome by a growing base of manufacturers, who have developed the necessary expertise. Electro-textiles have yet to move beyond niche applications, but there is renewed focus on actual user needs.

Smart textiles step up

Need to have, or nice to have? Avoiding the gimmicky to provide true value is one of the many issues developers of smart textiles have grappled with for years. Increasingly though, companies in the diverse, if not to say eclectic, world of wearables are taking a more pragmatic approach by addressing actual user needs. Developing smart clothing is nonetheless a costly process that lacks a broad consumer base to generate market momentum and the funds for further research, especially for the small businesses and start-ups that fill this space. In a move to encourage the development of a smart textile infrastructure in Europe and North America, state-led programmes have been set up to provide funding, mentoring and networking services for this sector. They seek specifically to back the best user cases and fill the gaps in the manufacturing supply chain.

The European Union is dedicating a portion of the funds it allots to the European textile industry to encouraging innovation and building infrastructure for smart textiles. In the US, a similar programme, the Advanced Functional Fabrics of America (AFFOA), also directs funding and resources to this field. These initiatives suggest that smart textiles expertise is considered essential, and market research tends to confirm

Clim8's smart thermoregulating textiles have been adopted by Swiss sportswear brand Odlo, French motorcycling brand Ixon as well as Burton Snowboards and The North Face.

CREDIT: PEIGNÉE VERTICALE

their potential to grow. The EU-funded and Euratex-led SmartX programme estimates that the market for smart textiles will reach €1.5 billion by 2025. This positive outlook is based on a 2018 report by Kamitis, a French business intelligence agency, which values the global market for smart textiles at nearly $1.5 billion in 2021, and on a 2021 smart fabrics industry report by Grand View Research in the US, which set the bar at nearly $3 billion for the European market alone in 2024.

If these numbers are to be believed, then who are the players that will bring smart textiles to the mainstream? Lutz Walter, coordinator of the European smart textiles accelerator SmartX and secretary general of the European Technology Platform for the Future of Textiles and Clothing (ETP), is not convinced that big players will invest in the development of smart textiles, but sees promise in smaller players seeking to address niche demands. This, he says, "is where you find hell-bent enthusiasts hell bent on developing new solutions for very specific use cases."

SmartX is one of many EU-funded programmes launched to support SMEs specialising in electro-textiles. Currently in the second year of a three-year programme, it has a budget of €5 million to distribute to 25 collaborative projects every year. "SmartX funds late-stage projects that are based on a real manufacturing supply chain, have been tested in a real environment, have a solid business model, and, ideally, are textile-based. These are all necessary for the creation of a viable supply chain in Europe, which is the goal of this programme," says Mr Walter. Footfalls & Heartbeats, a British company specialising in textile-based sensors, has received funding from SmartX to develop a motion tracking knee sleeve (KiTT).

> **"SmartX funds smart textiles that can lead to the creation of a viable supply chain"**
>
> LUTZ WALTER, SMARTX

SmartX is not the only EU-funded programme for SMEs specialising in smart textiles. French technology conglomerate CEA's SmartEEs programme has a budget of €8 million to support innovation in flexible and wearable electronics. The European Light Industries Innovation and Technology (ELIIT) project backs innovation in smart textile, clothing, leather and footwear, offering €70,000 to each of the 25 projects selected every year of its three-year programme.

NMES Group's neuromuscular electrical stimulation concept is based on a nanocarbon film.

CREDIT: DIPULSE

Re-FREAM, part of the European Commission's Horizon 2020 research and innovation programme, grants €55,000 to ten companies every year. Galactica, another such programme, has a €5 million budget to promote innovation in smart textiles for aerospace applications.

These programmes all fundamentally seek to build a European supply chain for smart textiles by encouraging collaboration and co-development. "Funding greases the wheels, and it is not only about money, but also about providing assistance in finding investors, banks and manufacturing partners within Europe," explains Mr Walter.

Collaboration is key

The smart textile start-ups, having developed commercial-ready or scale products, benefit for the most part from close collaboration with textile manufacturers. In 2020, French electro-textile heating specialist clim8 raised €2.75 million from several companies that include a traditional textile manufacturer. NMES Group, a company based in Sweden and Hong Kong, has developed a close partnership with Taiwanese manufacturer Far Eastern New Century (FENC) to develop its electromyostimulation products. Twinery, the e-textile division of Sri Lankan manufacturer MAS, collaborates with start-ups and brands to create smart clothing for fitness, gaming and other applications. Myant, in Canada, has recently joined forces with an electronics manufacturer, URtech, to launch its 'textile computing' platform.

At clim8, the new funds have gone into setting up an in-house laboratory equipped with a thermal room and machines to make and test prototypes. "It allows us to provide services that we would previously have outsourced," Florian Miguet, CEO and founder, tells *WSA*. The shutdowns due to the coronavirus made this new structure all the more useful as its research and manufacturing partners closed and supply chains were disrupted. "There is a lot of fine-tuning involved in product development that is best dealt with by our own staff," he says, mentioning the company's latest product, a smart glove created for US company Mechanix Wear. "We can now validate our technology through lab and field testing of the product and the app," he says. The company has also reinforced its team, which now includes three experienced PhDs, two of which specialise in human physiology. "We can develop the best user case with brands and work together to match user expectations," he says.

The e-textiles platform of NMES Group is the result of a close collaboration with FENC and support from The Mills Fabrica, a Hong Kong-based textile innovation incubator. "FENC is a key partner that has the ability to scale up," says Timothy Statham, NMES Group CFO. The company has recently launched a range of neuromuscular electrical stimulation garments and ancillaries that it is commercialising under its own brand, diPulse. The technology is also available to companies as a white-label platform, which Swedish fitness wear brand CLN Athletics has signed up for, with others in the pipeline. With FENC, NMES Group has developed a proprietary nanocarbon conductive film, which "serves as a common chassis for the development of all the products and markets we seek to address," Mr Statham tells us. It plans to develop additional products and technologies for sports and fitness, the military, gaming, and medical applications.

After having developed a first series of tops, bottoms and ancillaries for electromyostimulation, the company is now working on an apparel range that will activate muscle groups during all intensity activities from gym training to walking. Military applications are another area that it is pursuing. "We can help soldiers improve their performance and recover faster after training," says Mr Statham. Gaming is another area where the technology developed by NMES Group has a promising use case. Through muscle stimulation,

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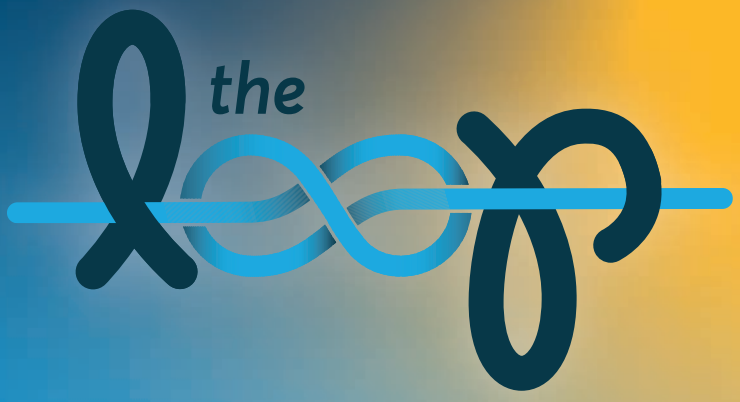

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the smart garment provides sensory feedback linked to the game play which he says can be very realistically rendered, with a video to prove it. "This adds sensory immersion to the gaming experience," he says.

Myant has just released its Skiin smart clothing concept for beta-testing, made possible in part by its partnership with URTech, which has manufactured a first production run of 15,000 Skiin Pods. The two Toronto-based companies would like to make the capital of Ontario a hub for smart textiles.

"Now that we are ready to launch a consumer-grade product, we need to deliver a higher standard of robustness and reliability compared to the iterations developed for research purposes," says Hannah Fung, the company's spokesperson. "The product is at a stage where it can deliver fundamental value to a user." Currently classified as a wellness device, Myant's goal is to achieve a Class II medical device status for Skiin. "We have submitted an application with Health Canada and are in pre-submission with the FDA. With approvals from these bodies, we will be able to make ECG-related claims. Essentially, a switch is flipped on the backend, an update is pushed to the Skiin Connected Life app, and users will have access to ECG at home. We are hardware-ready, so all that needs to happen is a software update," says Ms Fung. The company also hopes its public beta-stage process will attract companies sharing a similar vision.

While the sports and wellness markets draw much media attention and have fewer barriers to entry, medical applications are often the final goal to prove the reliability and utility of smart textiles. British e-textile company Infi-tex has developed a smart insole that can be used by athletes but can also address health-related needs. Currently in field tests, its Infi-sole smart sole monitors gait and is part of ongoing research with a university team in the UK to study the relationship between pain and fatigue through the soles, says Myra Waiman, Infi-tex managing director. "Among people aged 50+, 65% have musculoskeletal issues which the soles could detect. Existing devices are expensive and bulky, whereas ours is very thin and comfortable to wear." She foresees a possible application in the early detection of diabetes ulcers. The company does not manufacture the product but intends to license the technology, which is derived from Soft Switch, an electrotextile initially developed and patented by Peratch, which Infi-tex acquired.

Ensuring reliability

The next step for e-textiles is to ensure their utility and desirability, ideally backed by a framework of standards. In the EU, work is underway to develop norms for firefighter smart shirts and LED-embedded textiles offering active illumination. IPC, the global association for electronics manufacturing based in Bannockburn, Illinois, is also working on the creation of e-textiles standards. It has set up several committees whose boards include research centres, laboratories, manufacturers and brands from all over the world.

Currently in beta testing with consumers, Myant's textile computing Skiin smart underwear monitors heart rate, body temperature, activity, posture and location. Future features will include sleep monitoring, slip and fall detection, and ECG, pending regulatory approval.

CREDIT: MYANT

"There are a lot of issues with e-textiles at consumer level," says Vladan Koncar, a professor at the French textile engineering school ENSAIT, based in Lille, and a member of the e-textiles programme at IPC. "Many smart textiles are designed to be used as underwear. These items of clothing need to be washed at least 50 times. But the functional components and conductive elements may not withstand so many laundering and drying cycles. This is why better testing methods, backed by globally recognised standards, are needed," he says.

Having developed more than 300 standards covering the electronics supply chain, IPC is confident that its protocols can be applied to smart textiles. "A standard has already been approved for conductive yarns embedded in woven and knitted fabrics, and one for conductive yarns in braiding is under revision," says Christopher Jorgensen, director of technology transfer at IPC. This will enable a company in the market for a conductive yarn to compare the performance features of yarns made by various

The e-NF smart ribbons developed by French manufacturer Satab are designed to facilitate the integration of electronics into clothing.

CREDIT: SATAB

E-textile designer Marina Toeters won a Red Dot award for Bilihome, a device made to treat infant jaundice.

CREDIT: BILIHOME

suppliers using the same parameters, he adds.

The organisation has conducted industry surveys to identify the specifications required in the fashion, sportswear, PPE, military and medical sectors. "These allow us to develop standards that cover real industry needs," says Mr Jorgensen. He points out that a light integrated into a handbag will not present the same safety risk as electronics worn next to the skin. It plans to have a working document for General Principles and a guidelines handbook for different classes of products ready by the end of 2021.

Power and privacy

Thanks to new thinking with regards to power usage and privacy, electro-textiles are safer and easier to use, says Marina Toeters, a Dutch Fashion tech designer who has worked with Philips and the Holst Centre, based in Eindhoven. "Some features require very low levels of energy, making it possible to do away with a battery altogether," she says. This implies reducing some functions, but it can also offer privacy protection, by keeping biometric data in the item of clothing instead of transmitting it to a cloud.

"Making an LED blink faster than the human eye can see it, can lead to a 50% reduction in energy use," says French fashion tech designer Florence Bost, who collaborated on the development of e-NF, a range of smart braiding manufactured by French ribbon specialist Satab, and who is also working with IPC.

These small but essential tweaks are part of a trend to streamline functions and make smart clothing more accessible. "The general outlook of companies has changed," says Ms Bost. "They are now beginning to think of actual user scenarios, and they are more open to collaboration." This is the result of the partnerships imposed by EU-funding programmes, but she says they may also be due to the pandemic. She concludes: "Collaboration that was impossible beforehand is now seen as essential."

The Fitbits and Apple watches have made biomonitoring a seamless, and streamlined, feature for professional athletes and fitness enthusiasts. Transposing biometric data-capturing devices into clothing has proved to be challenging, but not impossible, as a specialised manufacturing base builds up. If companies continue to focus on applications that users need, as opposed to want, the development of a genuine, though niche, market for electro-textiles could become a reality.

Producers of wood-based fibres, a group of materials spanning viscose, lyocell and acetate, are quick to promote their plant- or bio-based raw materials. But these manmade cellulosic fibres face two key challenges. They need to prove they play no role in deforestation and they need to provide guarantees with regards to the chemicals used in the process of turning a hard yet fibrous material, namely wood, into a smooth and silky, drapeable fibre.

In the forest of fibres: Old versus new growth

Plant-based is the catchword of the day in sustainable apparel. Along with wood-based, these terms are used to describe manmade cellulosic fibres (MMCFs) to play up their renewable raw material origin. Behind the appealing wording, this industry faces a challenging task: as demand grows for these fibres, so does pressure to address the sustainability of sourcing and manufacturing processes. Behind the hangtags that glibly indicate the wood- or plant-based origins of a garment made from a viscose, modal, lyocell or acetate fabric, the reality is not so fetching.

Reports exposing the negative impacts of the MMCF industry come in steady streams and from a wide array of organisations exposing unsustainable practices related to forestry and chemicals, and spanning biodiversity to working conditions. The four main hot-spots viewed as problematic are, in a nutshell, the opaque nature of the logging industry, the production of dissolving pulp, operations at MMCF mills, and the use of sodium hydroxide and sulfuric acid to make the fibres. Since 2017, The Changing Markets Foundation has released "Dirty Fashion" reports every year. Fashion for Good and Greenpeace have recently added their own tomes to the topic.

An industry under scrutiny

Canopy, based in Vancouver, Canada, has been monitoring this sector since 2013, publishing its first CanopyStyle report in 2014. The organisation founded and headed by Nicole Rycroft has arguably had the most impact on the industry, not

Tencel, a lyocell fibre made by Austrian producer Lenzing, is considered one of the more eco-friendly of the MMCFs with its closed-loop NMMO-based chemistry. In 2020, the company invested some €34 million in an R&D programme exploring different plant-based materials as a source of cellulose, including hemp, straw, and bamboo.

CREDIT: LENZING AG

only by shining a spotlight on its dark underside but also by rallying major brands and retailers to mobilise manufacturers and instigate change. Its annual Hot Button Ranking monitors progress made, and progress is being made. In the 2020 report, eight major MMCF producers, Eastman, ENKA, Formosa, Jilin, Kelheim, Tangshan Sanyou, Xinxiang Chemical Fiber (Bailu), and Yibin Grace earned what it calls 'green shirt' designations. Two, Birla Cellulose and Lenzing, obtained the first-ever 'dark green shirt' ranking. The organisation estimates that 52% of global MMCF production is now made from wood pulp whose sourcing has been assessed as being of low or no known risk. This is a great achievement, says Ms Rycroft, but she points out that this still means 48% of the MMCF fibres produced yearly do not provide the same guarantees.

"Plant-based is being marketed as the holy grail," she says. And this is, in part, fair as wood is a renewable resource. But Canopy estimates that 30% of viscose is currently sourced from ancient and endangered forests. "Those are not a renewable resource," she says. "It takes hundreds of years to develop the functions and qualities of a mature forest." She also stresses that maintaining forests has been identified by climate scientists as the fastest, cheapest and most effective way to address climate change. Forests are furthermore believed to provide habitat to an estimated 80% of the world's terrestrial biodiversity.

The threat to these natural ecosystems remains high. Production of MMCFs increased twofold between 2013 and 2020 and is expected to double again in the next eight to ten years, says Canopy.

Chemicals of concern

In addition to the issue of logging, the making of wood pulp and manufacture of viscose filaments and their kin involve heavy-duty chemistry. To drive change at this stage of the manufacturing process, which is not Canopy's field of expertise, it reached out to the ZDHC Foundation, which has now added MMCFs to its Roadmap to Zero Programme. "Fibres are an important part of the value chain and global viscose production has been growing fast," says programme director, Scott Echols. Within the production process for MMCFs, he says the most critical impacts come from chemicals that can be released into the air, water and soil. The organisation released MMCF Guidelines for wastewater and air emissions last year and expects to publish guidelines for filament MMCF production and dissolving pulp processes in the near future.

As Canopy's Hot Button Ranking indicates, the main producers of MMCF have taken action. It helps that this industry is highly concentrated, with a handful of companies (11 to be precise) controlling 75% of global viscose production, as indicated in the Changing Market's 2018 report. The manmade cellulosic fibre family represented 6.4% of total fibre production by volume in 2019, some 7.1 million tonnes, according to the Textile Exchange's Preferred Fibre Material Benchmark Market Report for 2020. Viscose accounts for the greater part of this market (79%), followed by acetate (13%), lyocell (4.3%), modal (2.8%) and cupro (>1%). This last MMCF is not made from wood pulp but from cotton linters; Japanese producer Asahi Kasei is the only producer of this type of fibre.

Campaign organisation Canopy seeks to reduce the pressure on ancient and endangered forests from MMCF production. It is backed by over 300 brands that have joined its CanopyStyle initiative.

CREDIT: PAUL HILTON / CANOPY

Action on the ground

Austrian producer Lenzing and India-based Birla Cellulose are the two companies that have made the most effort to abide by Canopy's recommendations. "More than 99% of wood and dissolving wood pulp used by the Lenzing Group is either certified by FSC and PEFC or inspected in line with these standards," says Lenzing's head of corporate sustainability, Peter Bartsch. The company produces much of its own pulp, 62.4% coming from its own operations in 2020. It plans to increase its wood pulp dissolving capacity to cover 75% of its fibre production needs by 2024, in part the result of a new pulp production facility in Brazil.

Birla Cellulose, which is part of the Indian conglomerate Aditya Birla Group, says it sources 100% of its wood pulp from suppliers complying with FSC, SFI or PEFC standards. "We source our wood pulp from mature countries and avoid regions where deforestation is a risk," Mukul Agrawal, the company's head of sustainability, tells *WSA*. To address the issue of chemicals management, he says Birla Cellulose has invested $175 million to set up closed-loop processes, complying with the EU's best available technologies emission limits (EU-BAT), which also complies with ZDHC recommendations. "We aim to recover over 90% of the sulfuric acid used in all of our sites by 2022, and we are already halfway there," he says.

Birla Cellulose says it has developed the world's only closed-loop and chlorine-free pulp facility. Its Liva Eco yarn reduces water use by 90% compared to conventional viscose fibres.

CREDIT: BIRLA CELLULOSE

German viscose producer Kelheim has chosen to abide by the guidelines of the Eco Management and Audit Scheme (EMAS), a standardised certification system set up by the European Union, which it says offers greater transparency and covers all of the company's operations. "We exclusively use wood pulp sources from suppliers with FSC or PEFC certification," says Kelheim sustainability manager, Timo Thunitgut.

Sateri, a producer of MMC fibres based in Shanghai, has also committed to better policies with regard to sourcing and chemicals management. In 2020, some 96% of the wood pulp it sourced was from certified or controlled sources and it aims to achieve 100%, says Sateri's vice-president for sustainability, Sharon Chong. "The average total sulfur recovery rate for our viscose mills is over 95%, one of the highest in the industry," she adds. The company intends to make its viscose mills comply with the emission limits of the EU-BAT by 2030. It does, however, also plan to increase production. Sateri announced in March that it will expand its (closed-loop) lyocell production from an annual capacity of 25,000 tonnes to 500,000 tonnes by 2025.

US acetate manufacturer Eastman imposes high standards for its pulp sourcing and shares the names and mill locations of its three main pulp suppliers on its website and company documents. "Canopy's work is very relevant to the industry, as many brands will only source from Green Shirt suppliers," says Ruth Farrell, Eastman marketing director, adding that Eastman is the very first acetate manufacturer to have joined the ZDHC Foundation.

Late last year, Eastman launched Naia Renew, a new version of its branded acetate yarn, sourced from 40% recycled content. Wood pulp accounts for 60% of the raw material to make the fibre, and the acetic acid, which makes up the remaining 40%, is now derived from recycled plastics. The company has developed a chemical recycling process it calls Carbon Renewal Technology (CRT) that breaks down a wide array of difficult-to-process plastics to their molecular units. The proportion of recycled input is based on a mass balance system, certified by ISCC, a global sustainaility certification system, which monitors that inputs match outputs, she says.

Not only wood

The next step for Eastman, as well as for other makers of manmade cellulose fibres, is to replace pulp made from wood with other natural resources that have a high cellulose content. In its 2020 sustainability report, Eastman revealed plans to launch a non-wood-based fibre in late 2021. "We are looking at all types of alternative feedstocks to develop a fibre that would be indistinguishable from the yarns we currently make from wood pulp," says Ms Farrell.

Many major MMCF producers have begun to invest in and develop fibres that can be made from non wood-based pulp. Lenzing launched Refibra technology lyocell in 2017, which incorporates recycled cotton fabrics and has steadily increased its recycled content. Up to 10% of the recycled raw material can now contain post-consumer cotton waste. Its next stated goal is to increase recycled content to 40% by 2023.

The recycled content used to make these next-generation MMCF fibres is, for the most part, drawn from post-industrial waste, unused fabric provided by garment manufacturers. At Birla Cellulose, Liva Reviva is made from 20% pre-consumer cotton fabric waste. Here again, the company says it takes care to source the fabric from reliable and respected suppliers, says Mr Agrawal. Production has been scaled up by 700% he says, as demand for this fibre is high. The company plans to increase the percentage of waste that can be incorporated into the fibre, whilst keeping its cost within an acceptable market

range. "Good-quality waste is expensive, if we pushed to reach 100% recycled content, it would be too expensive. We have come to an agreement with our brand partners to supply Liva Reviva in large volumes and without sacrificing quality or price," says Mr Agrawal.

Birla Cellulose is working with several textile start-ups seeking to scale up alternatives to wood-based pulp. These include Nanollose, which uses food waste to produce a pulp suitable for lyocell production, Re:newcell, which recycles waste fabric and used clothing into pulp, and a project to extract cellulose from agricultural biomass with Fashion For Good. "In this programme, we are looking to identify three or four possible sources of biomass, to see what applications they could have, what machinery is needed and in what blends the fibre could be used," says Mr Agrawal. He insists on the importance of finding a solution that is scalable and provides yarns that can be used in all types of fabrics. The company is also a partner in a research programme funded by the Laudes Foundation to develop a fibre made from agricultural waste.

Making viscose fibres from pre- and post-consumer textile waste is also on Sateri's agenda. Its Finex branded viscose is made with pulp from recycled cotton fabrics supplied by Södra (OnceMore) and Re:newcell (Circulose). It has achieved Recycled Claim Standard (RCS) certification for these fibres which can include up to 20% recycled content, says Ms Chong. Chinese manufacturer Tangshan Sanyou's Revisco staple fibre, launched in 2019, is also made from 50% post-consumer recycled content with pulp supplied by Re:newcell.

Reducing wood and textile waste

The transition to next-generation fibres is a key focus for Canopy. Its research has revealed that 4.5 tonnes of trees are needed to make one tonne of viscose whereas the alternative raw materials in development, such as Re:newcell's, can turn one tonne of used cotton clothing into nearly one tonne of fibre, says Nicole Rycroft. Canopy is working to identify the most promising candidates among these new woodless MMCF ventures and build up demand from the 340-plus brands that adhere to its CanopyStyle programme. The organisation has asked brands to commit to these next-generation fibres with letters of intention to purchase, indicating specific volumes, to support research and investment.

While Re:newcell, Sodra and Infinited Fiber are turning fabric waste into pulp, a number of start-ups seek to extract cellulose pulp from agricultural waste. California-based The Hurd Co is developing what it says is a "gentle" chemical process, requiring less water and energy to dissolve hemp waste into its Agrilose pulp. "Hemp is a high-yield plant that contains a lot of cellulose," says company co-founder, Taylor Heisley-Cook. Still in the early stages of development, it plans to set up an R&D facility this summer before seeking further funding.

> **"Canopy's work is very relevant to the industry as many brands will only source from Canopy-rated Green Shirt suppliers"** RUTH FARRELL, EASTMAN

Circular Systems, based in Los Angeles, is also working on a method to manufacture a manmade cellulosic fibre it is calling Agraloop from hemp and flax agricultural waste. Hempcell is yet another such venture, co-developed by German textile research institutes and Berlin-based eco-brand Kind of blau.

Others still are focusing on introducing new chemistry for MMCF production, as is Swedish textile start-up TreeToTextile. It is working on a process, protected by several patents, which replaces carbon disulfide with what it describes as a "cold alkaline solution". "Our objective is to make a more sustainable fibre that can be scaled to address the needs of high-volume markets," says TreeToTextile CEO, Sigrid Barnekow. The company has received €35 million from its backers, which include H&M, IKEA and Stora Enso, to build a demonstration plant located at Stora Enso's Nymölla mill in Sweden.

Major manufacturers and new players are actively seeking to develop these new-generation manmade cellulosic fibres that are not based on wood pulp, but pulp made from used clothing or agricultural waste. This would help reduce pressure on the world's forest resources. It could also provide a solution for the waste generated both by agriculture and fashion.

The launch of a staple fibre in both Naia and Naia Renew opens a new category of more casual, athleisure applications for Eastman's acetate fibre.

CREDIT: EASTMAN NAIA

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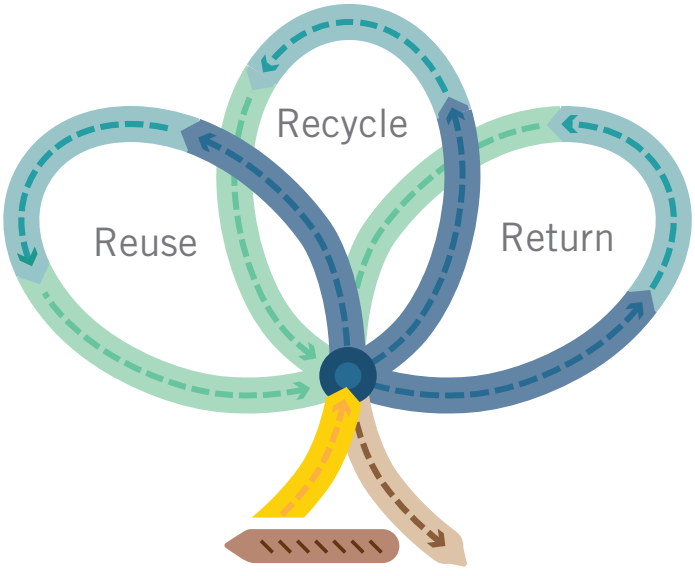

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*Cotton products are recyclable only in a few communities that have appropriate recycling facilities. †In composting tests, cotton fabric samples underwent a weight loss of approximately 50-77% after 90 days in a composting facility. Li, Lili; Frey, Margaret, Browning, Kristie (2020). Journal of Engineered Fibers and Fabrics. 5 (4). https://www.jeffjournal.org/papers/Volume5/5-4-6Frey.pdf

New tools are making it easier to keep track of products throughout the supply chain. Used not only to certify the presence of sustainable content, such as organic cotton or ocean plastics, these tools can now trace a product's entire lifecycle.

From tracing to closing the loop

Transparency in the textile and apparel industry is an ambitious goal, which remains largely unfulfilled. Brands and retailers are reluctant to share information considered confidential, and it is not even certain that they have a clear vision of all the companies involved in the making of their products. But brands and retailers readily set ambitious sustainability goals, which require accountability and a measure of transparency. If claims of having a certified material or product are found to be fraudulent, the risk to their reputation can be very real.

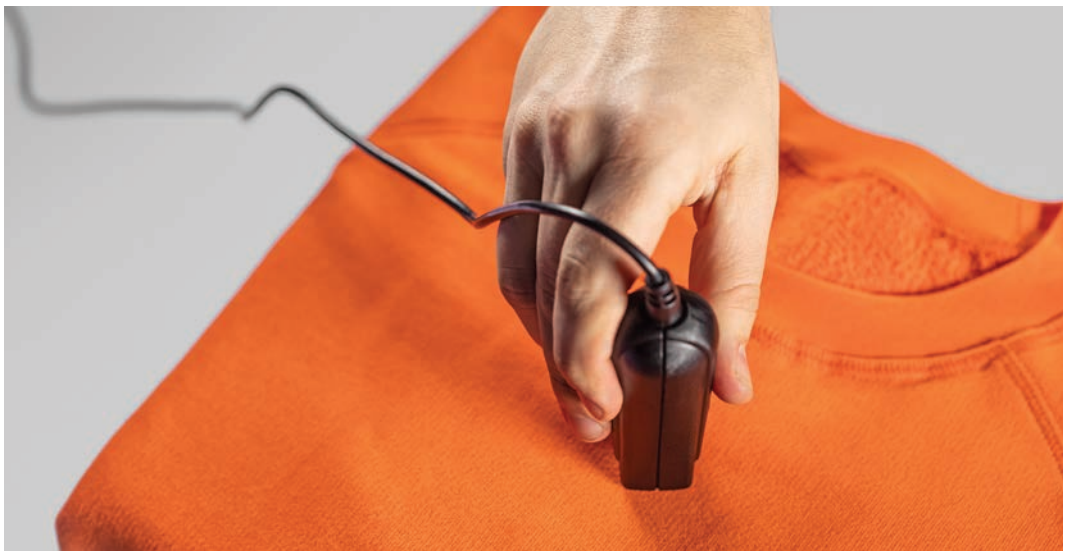
A new generation of start-ups is developing the tools to certify provenance and back sustainability claims, without adding too much cost. Thanks to innovation in information technologies, cloud computing, along with buzzy blockchains to not-so trendy (but maybe better suited) distributed ledgers, servers the world over are storing data and certificates for fibres, fabrics and items of clothing. Their so-called 'digital twins' will keep track of their making, their owners, and even their second life.

It all, nonetheless, starts with a strand of fibre, whose sustainable nature will often make up the greater part of an end product's total environmental score. This is the starting point for techniques to identify and certify the presence of organic or recycled content. FibreTrace, the brainchild of Australian cotton growers Danielle and David Statham, marks materials from the farm up. Spinners are the primary target of Aware, a traceability system launched by Dutch sustainable textile solutions start-up The Movement.

The Stathams, who are also the owners of Good Earth Cotton, founded FibreTrace in 2018 to keep track of their carbon positive cotton throughout its transformation in the textile and apparel supply chain. After investigating existing technologies, they chose a solution based on a luminescent pigment, the same found on currency and passports. It patented a process that is said to withstand all manufacturing stages. Initial trials were conducted on cotton grown on the farm, made into a denim fabric used by Australian jeanswear brand Nobody Denim, which launched a first fully traceable range last year. "If it survives the many manufacturing and finishing stages of denim, it will survive anywhere," says FibreTrace CEO Shannon Mercer. The pigment can be applied to cotton, viscose, polyester, and recycled versions

The LEDs on FibreTrace's handheld spectrometer display the proportion of tested material that has a marker (shown here at a gin). "If a bad player adds 50% conventional cotton to a fabric labelled 100% organic cotton, the signal will indicate it, without having to send a sample to a lab," says Shannon Mercer, FibreTrace CEO.

CREDIT: FIBRETRACE



Aware combines a nanotech tracer with a blockchain, which it says is the only way to provide 100% certainty. A QR code won't offer the same level of security, and blockchain alone is not a solution, "it is only a tool, rubbish in equals rubbish out", says Koen Warmerdam, Aware brand director.

CREDIT: THE MOVEMENT

of these. The company is close to finalising an application process suitable for leather, and tests on wool are ongoing, in which case the pigment would be added during scouring. After the placement of this physical marker, the other stages of a material's transformation are provided by each company involved in its manufacture or logistics, the data is stored in the cloud, and copied and secured in a blockchain.

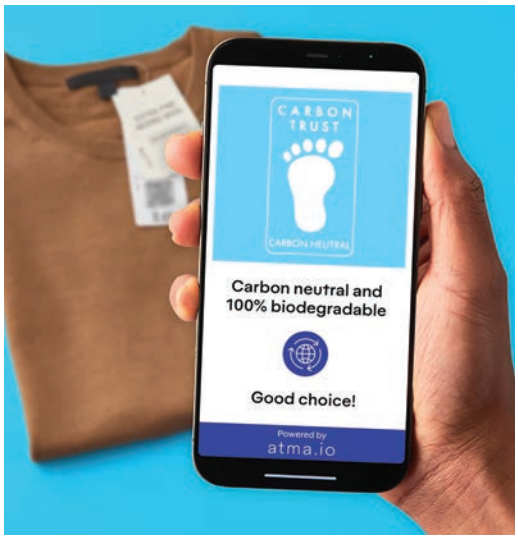
The Movement is transposing a technology developed by Circularise, a spin-off of the Delft University of Technology, from plastics to textiles. "Our founder, Feico van der Veen, was involved in this research programme," says Koen Warmerdam, brand director. Aware was launched in March last year with a dozen spinners specialising in recycled yarns. It uses different types of nanoparticle-based tracers, which are embedded in recycled cotton or recycled polyester yarns. The presence of the marker can be measured by a tablet or spectrometer. When a company places a purchase order, of say, 50,000 kg of yarn, it will receive 50,000 blockchain-backed tokens. Aware tracer material is added to the sustainable feedstock and 50,000 tokens are registered on blockchain. The yarn is now guarded and can be brought into a supply chain of the final brand. Final products are delivered to the company for a tracer detection test. After a positive scan, it issues a Certificate of Authenticity and transfers the tokens to the wallet of the final brand. Final brand then has access to all traceability data, including all certificates and impact data report. This, he says, avoids the risk of greenwashing. It is better than QR code-based tags that can be falsified, as revealed last year in improperly labelled organic cotton made in India.

Swiss start-up Haelixa has chosen a DNA-based marker, which has been approved by GOTS for application on organic fibres. Cashmere specialist FTC Cashmere has adopted the system to provide additional guarantees on the authenticity and origin of its luxury fibres. Cashmere is similar to organic cotton in that the number of cashmere products sold yearly is believed to exceed the amount of fibre produced in the world.

Data on product and impact

These platforms provide multiple services related to supply chain management and efficiency, but the main driver for adoption by brands seems to be sustainability, and drawing the attention of consumers, future employees, possibly even investors, to their commitments. This is why a new layer of data is being added, beyond basic sustainability certifications, to indicate a product's carbon footprint and thus generate engagement and trust from these stakeholders at large.

A new venture within Avery Dennison, atma.io, builds on the Glendale, California-based group's existing labelling infrastructure with the integration of new digital capabilities. It launched in March 2020 with adidas as part of the sports brand's sustainability strategy and resale platforms. The atma.io cloud already traces some 10 billion digitised items, and 50 more are added every second, says Max Winograd, VP, connected products, Avery Dennison Smartrac and atma.io co-founder. The system tags and monitors each individual product, down to the right and left foot of a pair of shoes. It can use any type of "digital trigger", including serialised QR codes, RFID, common in supply chain management, and NFC, more often used for authentication and consumer engagement.



atma.io, a new traceability platform launched by Avery Dennison, can connect with a brand's existing mobile app to add information and enhance the consumer experience. Adidas has adopted it to include resell options and indicate a product's carbon footprint.

CREDIT: AVERY DENNISON

Offering new tools for recommerce, or reverse commerce, and facilitating recycling are a key focus for CircularID, a digital tracing protocol developed by Eon Group, a company founded in 2015 and based in New York City. It is specifically designed to "share data across the entire lifecycle of a product, from maker to seller, consumer, reseller and recycler," company founder Natasha Franck, tells *WSA*. A pilot programme for CircularID was made available last year and a scaled up – 1.0 – version should be ready later this year. It too can use any type of smart tag that is attached to a product at the cut-and-sew stage. "We can associate data from earlier processes into the platform, but we do not apply a marker on the raw material," she says. Each individual product will, however, have a unique identity and digital twin. Brands trialling the system include For Days, Yoox Net-à-Porter (YNAP), Outerknown, Gabriela Hearst and Houdini (as reported in *WSA* Issue 1, 2021).

In the absence of a standard tracing framework covering all supply chain needs, these companies have for the most part made their platforms open and inter-operable. "Brands can use any blockchain they wish, our system is very open, as our goal is to create the connectivity," says Ms Franck. "FibreTrace is an agnostic, open-source system," says Mr Mercer, it can be associated with other certification schemes and databases. Aware can add information related to social compliance to its interface, and it is considering the integration of CRM and ERP that major brands use, says Mr Warmerdam.

Sharing costs

In addition to sharing data, these new platforms also believe that the cost of their services should be shared by users across the supply chain. "Transparency shouldn't have to cost the earth," says Mr Mercer. He believes FibreTrace adds less than 2 cents on a T-shirt, and says it can lead to higher sell-through rates. Aware supplies the tracer and sells tokens representing the volumes tagged. The Movement invoices a percentage to the nominated spinner and to the final customer, brand or retailer, the remaining amount based on quantities purchased and number of tokens. "We have designed this system to keep the price of yarn as low as possible," says Mr Warmerdam. He estimates that it can add 2-3% to the cost of a finished product. In the low margin business of textiles, these companies say they want to enable farmers and spinners to invest in better practices.

Carbon and bottle counting

As Mr Warmerdam points out at Aware "spinners are the ones that are innovating, increasing recycled content and the quality of yarns." Many a sustainability claim relies on the recycled or organic nature of a fibre or filament. Greensboro, NC-based polyester producer Unifi adds a marker to its Repreve-branded polyester recycled from PET bottles or ocean plastics. This allows a brand to request "bottle counts" for the products made from these yarns.

It is then relatively easy to calculate a product's environmental impacts. "We add LCA data information to a material's profile on blockchain based on validated LCA data," says Mr Warmerdam. These resources are also being harnessed by atma.io, down to distance travelled and method of transportation used, captured and communicated on its platform. Consumers can gain added insight into their own carbon footprint, and the potential impact of using it more or reselling it, says Mr Winograd.

> **"Once you take into account usage at consumer level, every product has a unique life cycle."**
>
> NATASHA FRANCK, CEO AND FOUNDER, EON GROUP

This is the reasoning behind tracing each individual product. "Once you take into account usage at consumer level, every product has a unique lifecycle. Also, a system that follows a product's entire lifecycle will be able to indicate whether it has been recycled or not. This is not an important issue in a linear economy, but it is essential in a circular economy," says Natasha Franck.

Not only do these technologies streamline services that in the past were difficult to obtain or impossible to certify, but they are also providing product-level environmental information in an easy to access format. There is arguably room for improvement in the quality of the datasets used to calculate impacts, but it can also be argued that any form of transparency reduces the risk of greenwashing. These smart-tagged products and cloud-based platforms are bringing clarity to an opaque supply chain and they are doing so, not just SKU by SKU, but more granularly, one shoe at a time.

The CircularID Protocol created by Eon Group is part of the Accelerating Circularity programme and is collaborating to develop a passport for products and facilitate recommerce and recycling.

CREDIT: EON GROUP

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> We are quick to talk about end-of-life but we forget to ask how long we expect products to last.

STEVE LAYTON, AT POLARTEC'S RECENT SCIENCE OF SUSTAINABLE PRODUCT PANEL DISCUSSION

Passion empowered

RISE TO THE CHALLENGE

Polartec is marking the thirtieth anniversary of the formal launch of the brand by celebrating fabrics and garments that, since 1991, have changed what we wear when we go into the outdoors.

Performance textiles developer Polartec is running an initiative to celebrate the thirtieth anniversary of the brand's launch. It has called the campaign 'Peaking Since 91'. It wants to use the anniversary to highlight milestones of what it has called "an extensive history of fabric innovation" that includes "category-creating inventions that have empowered millions of passionate outdoor enthusiasts". Developments from down the decades that feature include, of course, PolarFleece, invented in the years leading up to the launch of the brand by then parent company, Malden Mills.

Combined efforts

Polartec president, Steve Layton, says the history of the brand and the Polartec company is one of transformation, "from a traditional mill into a performance textile innovator". An important aspect of this transformation is its work with business partners, joint efforts that have resulted in "iconic fabrics and garments that changed what we wear when we go outside".

Malden Mills had already been manufacturing textiles in Massachusetts for 85 years before it introduced the Polartec brand; this commitment to working in partnership with people outside the business was also sewn into the fabric of the parent company. In fact, it was precisely this that led to the development of the PolarFleece fabric that helped give the brand its name. Patagonia founder, Yvon Chouinard, had long left his native New England for California, but he knew all about the textile heritage of Massachusetts and it was on Malden Mills' door in the town of Lawrence that he knocked one day in 1981 to ask for help.

Mr Chouinard had with him prototypes he had been working on for a synthetic sweater for people who shared his passion for mountain climbing. He asked the team at Malden Mills to help make the fabric softer. This led to the invention of synthetic fleece, which led to Polartec becoming a brand and then a company in its own

Worth waiting for. A climber puts Houdini clothing, made using Power Air fabric technology from Polartec, through its paces.

CREDIT: HOUDINI

right. According to David Parkes, the founder of textile resource and garment production service Concept III, this was the moment that outdoor apparel, as a category in its own right, was born.

Natural flow

This commitment to combined working continues at Polartec today; the chief executive of Swedish outdoor brand Houdini, Eva Karlsson, shares it. She says her aim has long been to mimic nature in the clothing the company offers to skiers, cyclists, skaters, hikers, kayakers, climbers and everyone else who loves being active in the outdoors. For her, this means moving from linear to circular thinking, with everything "flowing naturally" and nothing going to waste. "We live on a planet that is amazing and beautiful," Ms Karlsson says, "but we are consuming everything that makes life worth living. We are consuming at an ever-increasing rate."

A good example of Houdini working successfully with others (in this case Polartec) to achieve this transition is the Mono Air project. Houdini launched its Mono Air Houdi in 2019 and won an ISPO Gold Award in early 2020 for the product. It uses Polartec's Power Air fabric technology, made from circular mono material and engineered to reduce microfibre shedding by 80% compared to other premium mid-layer weight fabrics, while still retaining warmth. Polartec unveiled the new fabric at the end of 2018, saying it had achieved this breakthrough by encapsulating lofted fibres within a multilayer, continuous yarn fabric construction during the knitting process. The encapsulated air shelters the lofted fibres.

In 2020, Houdini and Polartec decided to make public all the details of what they had done in developing Mono Air. "We looked at design, innovation opportunities and engineering to create a much more resilient fabric," Eva Karlsson explains. "We ended up with a more creative purpose, stronger product development in general and a better fabric that's more durable. We asked ourselves: how do we waste as little fabric as possible? How do we achieve the functional details? How can this be beautiful?"

Beauty counts

On the questions about performance and beauty, she says that it would be unacceptable to compromise on performance or comfort in any effort to "go circular and sustainable". In fact, to make such a compromise would be the opposite

of being sustainable, she points out. Beauty counts, too, for a similar reason. If people love a garment, they will wear it time and time again. "We need to make products that people fall in love with and stay in love with," the Houdini chief executive explains. "That promotes longevity." It was because of this lack of willingness to compromise that it took until 2019 to launch Mono Air; discussions about it began in 2013. "A short-cut wouldn't have helped us in the long run," Ms Karlsson says. "We all benefit from doing things properly."

Recent developments in using recycled fibres in Polartec fabrics include a project with Italian cycling clothing brand Santini. It has renewed an existing partnership with the Union Cycliste Internationale (UCI) to produce the UCI World Champion Jersey for the next four years. It has committed to using 100% recycled fabric from Polartec. The manufacturer has been making fabrics that use recycled content for more than 25 years and claims to have saved more than 1.8 billion plastic bottles from landfill in that time.

The jerseys will use a recycled version of Polartec Power Dry, which offers what the fabric brand calls "advanced next-to-skin moisture management". It uses a bi-component knit construction.

Under new ownership

Since 2019, Polartec has been part of Milliken & Company, which said at the time that the addition of a specialist performance fabric developer, particularly its outdoor and fleece textiles, would "round out" its existing portfolio of performance textiles for consumers, industrial workers and military personnel around the world.

According to Steve Layton, being part of this larger textile group enables Polartec to put forward "four product mandates". The first of these is enhanced durability in its products. "Longevity is one of those areas that doesn't get talked about enough," the brand president says. "We are quick to talk about end-of-life but we forget to ask how long we expect products to last." The company is looking closely at the options for what to do with garments made from its fabrics after consumers have finished with them. Chemical recycling and enzyme recycling are "becoming interesting", Mr Layton says, but he says the solutions available today are not yet scalable. "We need a longer-lasting product until the technology is scalable and up and running," he insists.

Next, he says Polartec products can now benefit from Milliken's chemistry and research. He points to the "significant breakthroughs" the group has made in water repellency, for example. Third is an ongoing focus on fibre-shedding, with the necessary impact this makes on fabric construction and fibre choice in performance fabrics. It will also aim for, in its fourth mandate, total circularity, continuing to use recycled inputs to make products that are durable and can be recycled into raw materials that can then be made into a new product for the same use.

Developments with recycled fibres include this new UCI World Champion Jersey from Santini.

CREDIT: SANTINI

Outdoor adventures

As part of the Peaking Since 91 campaign, the brand has run a competition, asking outdoor enthusiasts to submit photographs of themselves, their friends and family members on their outdoor adventures. Entrants have the chance to win limited-edition products.

In Europe, Italian designer Leo Colacicco, the force behind fashion-brand LC23, has made two exclusive pieces for the competition winners. There is a fleece jacket called the LC23 X Polartec Peaking Since 91. A final grand prize comprises two LC23 X Polartec Peaking Since 91 armchairs made of the offcuts from the limited-edition fleece.

In North America, entrants have a chance to win garments from partner brands and grand prizes that include VIP ticket packages to music festivals including the High Sierra Music Festival, LOCKN', Northwest String Summit, and Summer Camp Music Festival. The contest runs until the end of May; some lucky entrants have won prizes already.

MILESTONES

1981	Malden Mills launches the first circular-knitted synthetic fleece, PolarFleece, developing the idea in partnership with Patagonia founder, Yvon Chouinard
1991	Polartec brand founded
1995	Devastating fire at the Malden Mills factory in Lawrence, Massachusetts
1997	Rebuilding project complete
2007	The Malden Mills company is renamed Polartec
2009	Softshell fabric technology Power Shield Pro introduced
2010	Neoshell launches as "the most breathable waterproof fabric on the market"
2013	Development of an insulation system for extreme temperatures, Polartec Alpha
2017	New fill insulation product, Power Fill
2018	Unveiling of Power Air fabric technology
2019	Company acquired by Milliken
2021	Thirtieth anniversary celebrations of the Polartec brand

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No short-cuts

NEWCOMERS

Compression and running garments that combine performance with sustainability and transparency are the first products to come to market from Pressio, a young company with an experienced head on its shoulders.

One of the founders of compression clothing brand 2XU, Jamie Hunt, has set up a new brand called Pressio. Based in Auckland, New Zealand, he was previously head of product at 2XU until two years ago.

He describes Pressio as a brand built upon the pillars of performance, sustainability and ethics; the yarn selection, knitting technique, dyeing and manufacturing approach it takes in making its products will be in keeping with these three pillars.

It launches with two ranges, run and compression, comprising singlets, shorts and long- and short-sleeved tops for the former and shorts, tights, sports bras, socks and calf-guards for the latter.

Pillars of wisdom

Explaining what was in his mind when pinpointing the three pillars, Jamie Hunt says that athletes, including himself (he is a former professional triathlete), want to buy the best products possible. They want to be sure that what they are wearing will not disadvantage them in any way and, if anything, will help them perform better. He has been creating textiles now for more than 20 years, he reveals, and thinks that with the recycled options available nowadays there is enough out there to make fabrics with a level of performance that is every bit as good as what is possible using virgin yarns.

"I almost got there," he says of the launch collection from Pressio. "I almost managed to do it. Sometimes I had to reach out to the yarn producers and we worked on a few things. As it's now ended up, anybody who wears the product will think the performance is amazing. Then, when they find out it's sustainable, they'll say 'wow'. That's the impact I wanted to have, to have the level of performance, but in as sustainable a way as possible."

He explains that between 90% and 95% of the material he has used in the launch collection is sustainable; to have gone beyond that would have meant doubling the price of the products. A combination of two of his three pillars has been enough to allow the new brand to "walk into some amazing accounts", including places that 2XU was unable to crack.

Good people

With regard to the third pillar, ethics, he says that, having been in the industry for a long time, he has had the advantage of visiting more than 100 factories in Asia and perhaps 30 or 40 in Europe. In addition, he has worked with hundreds of fabric mills over the years. All of this is an advantage, he explains, because he has had the chance to come to know these companies and form genuine partnerships with them. For Pressio, he has selected the mills and the factories he knew to be "the best of the best", in terms of ethics as well as quality. Most start-ups have little choice but to work with whatever factories have the availability.

He has made many of the names public on the transparency section of the Pressio website, unworried about rivals finding out which partners he is working with, preferring to flag up what he calls "a common thread" of quality and good practice.

"I want to be held accountable," he says. "If one of my dealers out there did something wrong, I'd want to be told. Our dyehouses are bluesign-approved. Our fabric factories have Oeko-Tex 100 certification and we're working on other certifications. People can email me and I'll send them all the auditors' reports. If you are telling an ethics story, you have to be transparent, you have to tell the marketplace who your suppliers are. And if you do that and something does go wrong, it's down on paper that I use them, so I have to know that they are regularly audited. I have to know that they are good people."

Boots on the ground

He makes the point that, culturally, brands from New Zealand and Australia are on the ground at their supplier factories "all the time". He has observed that those same suppliers hardly ever see their customers from Europe or North America, who seem more content to trust local agents and, perhaps, pay a visit themselves once a year for a day. "I'm always up there [in Asia]," he continues, "and I'm always speaking to the staff,

> **“Good fabrics don’t cost that much more, if you know what you’re doing.”**
>
> JAMIE HUNT, PRESSIO

The best way to be sustainable is to buy well made, good quality clothes that will last a long time, the brand’s founder says.

ALL CREDITS: PRESSIO

so it's not hard to find out if things are not right. You can have all the audits in the world, but you still have to be there, asking questions."

There have still been supply chain challenges for Pressio, though. One of the biggest was that, in developing new fabrics, new yarns and new technologies, it has been necessary for Mr Hunt to invest in what, for the new brand's needs, are "massive amounts" of product. Ordinarily, he might have ordered a fabric in three colours at 1,000 metres per colour. With new ideas, though, his partners didn't want to make only 3,000 metres. He is, therefore, carrying extra yarns and fabrics just to meet minimums and it is he who has had to take the risk on the technological breakthroughs for "quite a lot of extra money" and after intense negotiation with partners, although he insists it is paying off. A number of the launch products have 'sold out' stickers on them already on the brand's website.

Dyeing to innovate

Pressio is using printing techniques to eliminate batch dyeing in the majority of products in its range. Its compression fabric, which is one of the products that does not use recycled yarn at the moment due to the high cost of recycled nylon, provides a good example. When the manufacturing partner makes the chips, before it extrudes the yarn, it adds a pigment, applying colour to the chips. When it extrudes the yarn, the colour is already there. This process is called Eco-Dye.

"The conventional dyeing process is one of the most impactful processes, environmentally," Mr Hunt says. "Also, with compression fabric, when you go to dye it, it's done at quite a heat and that heat, with the chemicals in the dye-batch, can affect the power of the elastomeric yarns. It can vary the amount of power you have from batch to batch. Eliminating batch-dyeing, we're now finding that the power is exactly the same each time. We've increased the power because the compression fabric is not going through that destructive process. By taking the eco route, we have a better fabric."

Some batch-dyeing is part of the process for producing the company's running collection, but 90% of the fabrics it is using are dyed in other ways. Eco-Dye uses 80% less energy, 80% less chemical input, and lowers CO_2 emissions by 75%. At the moment, black is the only colour option, but Mr Hunt believes this will soon expand, and if more brands start to use it, the extra options will become available faster.

After-life

Even when athletic clothing collections are as new as Pressio's, end-of-life has to be a consideration for brands that take sustainability seriously, especially with questions in the air about the recyclability of recycled fibres.

Mr Hunt explains: "What we are looking to integrate is a trade-in programme. Customers will be able to send in their old Pressio garments and we will try to reuse them. But we are also working on biodegradable fabrics and, for a gym collection we intend to add, on running shorts that stretch so well they need no elastane. We're looking to improve things in any way we can. I want this brand to be known as a sustainability leader in the sporting goods space. The best way to be sustainable is to buy well made, good-quality clothes that will last a long time. Good fabrics don't cost that much more, if you know what you're doing."

Selecting yarns well is the brand's secret for securing the best balance between garments that help athletes and offer sustainability too.

He also expresses the hope that recycling programmes will expand and that plastic-based products we cannot recycle today will be recyclable in the future.

Trade-offs

Implicit in Jamie Hunt's insistence on combining performance and sustainability is a recognition that good options for performance have often been less good for sustainability, that a trade-off between the two exists. At the core of what he thinks companies need to do to achieve a good balance comes back to the selection of yarns.

He has brought with him from 2XU an insistence on carrying out denier-grading and filament-grading, grading the filaments on the back and on the front of the fabric. Do this well and you can have permanent, enhanced moisture management, for instance, without using chemicals, he says. If you use recycled yarns, though, the range of options reduces. "The demand hasn't been there," he says. "I've had to go out and track down other suppliers of recycled yarns so that I can have that level of moisture management. It's really hard to do that. There is recycled elastane out there, which I would love to use and I am looking at using in some non-compression items next year. But the modulus and the power are just not at the level that you get from Lycra, for example. At least they now have it. Let's hope the yarn suppliers can give us more selection."

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ALL CREDITS: INOV-8

Wonder material works magic again

FOOTWEAR TECHNOLOGY

Following on from its graphene-enhanced outsoles, the collaboration between UK-based Inov-8 and the University of Manchester is yielding more benefits for footwear.

Dodging rocks and stones and navigating uneven terrain are key skills for trail and ultramarathon runners, and footwear brand Inov-8 believes feeling a connection with the ground is crucial to speed as well as avoiding injury. While other manufacturers "seem hung up on" carbon plates to propel runners forward, the UK company has invested heavily in the potential of 'wonder material' graphene over the past few years. The quest for a trail shoe with better grip, adaptability, ride and fit, but which lets the foot move naturally, has culminated in its latest release, the G-Fly Max 300.

Inov-8's relationship with the UK's University of Manchester, home of the National Graphene Institute, began in 2017, after Dr Aravind Vijayaraghavan, a reader in nanomaterials, published a paper on how graphene could enhance rubber. Graphene is a single atomic layer of graphite — which itself was discovered in Inov-8's home, the English Lake District, in 1555, and was originally used to mark sheep (now commonly used in pencils). Graphene was characterised by University of Manchester professors Andre Geim and Konstantin Novoselov in 2004, earning them a Nobel Prize for physics in 2010. It is the thinnest and strongest material by weight, offering strength that is 200 times that of steel, at only one atom thick, and additional properties include transparency, flexibility and an ability to conduct heat and electricity. "It is remarkable that one material has all these properties," says Dr Aravind. "That is why we call it a wonder material."

Its potential is such that the EU committed €1bn to the Graphene Flagship for 10 years' research from 2013, and Manchester's Graphene Institute and Graphene Engineering Innovation Centre are among multiple academic facilities and private companies around the world that are dedicated to finding commercial uses in sectors from transport to energy.

Trial and error

The Inov-8 team began research and development with Dr Aravind and his team, and soon after launched a graphene-enhanced outsole collection, Graphene-Grip (see *WSA* Jan-Feb 2018). They say the resulting rubber is stronger, stretchier and more resistant to wear than standard rubber. Its G-Series won multiple awards and was rolled out across other footwear categories. This research piqued footwear specialist Doug Sheridan's interest. "Graphene often enhances the characteristics of the elements it's mixed with," he says. "Graphene is so new, it

has the ability to surprise and frustrate but also it has the unique ability to make these other materials perform their best."

Over the next couple of years, they experimented with foams: 50 mixtures tested in the lab and by 40 athletes in the field. Adding the graphene meant certain polymers were able to perform better, "but it's a sensitive chemistry, it's not just a question of adding more," says Mr Sheridan.

The final foam, which they call the G-Fly, is reported to give 25% better energy return than standard EVA foam as well as longer-lasting performance. Even after accelerated aging, it still offers 10% better energy return than the standard EVA and 'compares favourably' with EVA TPU blends, the company states. Added to style and performance updates including 10mm underfoot grooves that increase flex, The Trail Fly Ultra maintains underfoot bounce and comfort for longer. The three patent-pending technologies (Graphene-Grip, G-Fly and Adapter-Flex) could help runners maintain a faster speed over greater distances, help feet feel and prolong the life of their footwear.

Environmental impact

The increased durability extends the shoe's life, which the company points to when questioned on the environmental impact of adding graphene. Various graphene suppliers were considered, with the chosen one being certified to EU chemicals standard REACH. "Graphite is a natural material and we use a relatively small amount of graphene to deliver the impact so it doesn't measurably add to the carbon footprint of the shoe," explains Dr Aravind. "And the gains in sustainability by having a shoe that lasts a lot longer is the dominating aspect."

Guided by Mr Sheridan and working with the university team, Inov-8's footwear supplier was able to work with the new recipe. "Like everything else, it was a technology challenge: how do you scale up something you do as a small scale in the lab to production scale in the factory?" Dr Aravind tells *WSA*. "But we work very closely with Inov-8 and people in their partner factory, as well as Doug Sheridan. The manufacturability was one of the things we addressed as part of collaboration." He adds that the foam was launched into the ultramarathon sector because the energy return over long distances provides obvious benefits, but that he sees it being used in other types of footwear and, longer-term, could yield further advancements elsewhere in the shoe.

Cost cutting

With a number of outdoor brands — including Haglöfs and Vollebak — experimenting with graphene in textiles for clothing, it would seem the athletic footwear industry has been quite slow on the uptake, but Dr Aravind argues the opposite. "Graphene itself is a brand new material, it's less than 20 years old, and generally it takes much longer for a new material to make it into a consumer product," he tells us.

Years of outsourced research and development generally add to the cost of any product, but Inov-8 was able to benefit from a Knowledge Transfer Partnership, a UK government scheme that provides funding for innovative developments. This allows brands to bring expensive innovation to the marketplace, as research can be shared, keeping the costs acceptable for the consumer.

Inov-8 aims to stay the frontrunner when it comes to using graphene in footwear. "We have made a heavy investment into graphene but our name is Inov-8 so we have to lead with innovation and it's something CEO Wayne Edy really pushes through the company," says Michael Price, Inov-8's chief operating officer. "The investment is also about the future. We really believe we can grow the business and provide runners with product that makes a big difference to them and their running."

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> **“As brands and consumers become more aware of the negative impact we are having on the planet, the need for alternative materials and alternative ways to minimise impact will continue to grow.”**
>
> FLORIAN HEUBRANDNER, LENZING

Natural alternatives

SUSTAINABILITY

A recent report called Fossil Fashion takes synthetic fibres to task for having a substantially higher carbon footprint than alternatives from natural sources. It seems to have made a profound impression at fibre manufacturer Lenzing. Reading the report has led the group’s vice-president for textiles, Florian Heubrandner, to draw three main conclusions.

The vice-president for textiles at fibre manufacturing group Lenzing, Florian Heubrandner, has issued a call to arms to the whole of the fashion industry to redouble its efforts to secure “a carbon-free future”. He sees three principal sustainability trends impacting the fashion landscape in 2021. Of these, the first is “debunking myths and assuming responsibility”. Mr Heubrandner claims that many consumers remain unaware that “cheap fibres like polyester” are found in over half of all textiles and account for 530 million tonnes of carbon emissions per year. He says brands must continue raising awareness and decreasing their reliance on “cheap synthetics”.

He explains: “Polyester is incredibly energy-exhaustive to produce, equating to six times the carbon emissions of cotton, according to the 2021 Fossil Fashion Report.” This report, whose full title is ‘Fossil Fashion: The Hidden Reliance of Fashion on Fossil Fuels’, was published in February by a cluster of campaign groups: Changing Markets Foundation, the Plastic Soup Foundation, the Clean Clothes Campaign, Zero Waste Alliance Ukraine, No Plastic in my Sea and WeMove.EU.

Emission submission

It is from here that the carbon emissions figure quoted by the Lenzing vice-president for textiles comes. In turn, the report takes the figures from the Ellen MacArthur Foundation, which says in ‘A New Textiles Economy: Redesigning Fashion’s Future’, that CO_2 emissions from synthetic clothing are six times higher than the emissions from clothes made from cotton. The Ellen MacArthur Foundation report is from 2017; it gives a figure of 530 million tonnes of CO_2 for plastic-based fibres in comparison to 86 million tonnes for cotton. Figures for 2018 show that global fibre production that year was 107 million tonnes. Just over 62% was synthetic fibres, while cotton accounted for a little under 25%. The synthetic fibres, therefore, had 2.5 times the volume of cotton fibres, but six times the carbon emissions.

The Fossil Fashion report makes a clear connection between the popularity of polyester and its cheapness. It says: “In the US over 60 years, apparel has moved from costing 1.5 times the price of other items in the average consumer basket to costing less than half, strongly suggesting that fossil fuels are a fundamental

Conscious consumerism is having a great impact on many different aspects of life now, including textiles.

ALL CREDITS: LENZING

lynchpin of fast fashion. This is not surprising considering that polyester is cheap, costing half as much per kilo as cotton." Quoting figures from September 2020, it put polyester at around 85 cents per kilo and cotton at $1.89.

Prices send a message

Mr Heubrandner agrees and says that the rise of fast fashion is definitely linked to the widespread availability of "cut-price fossil-fuel-based fibres" such as polyester; this ongoing connection between fast fashion and high volumes of synthetic fibre is the second of the trends Mr Heubrandner has highlighted.

At the 2021 World Economic Forum (usually in Davos, but online this year), one speaker, Ken Webster, said he feared fashion companies, like most businesses, are still "fully embedded in a linear system" and he added that the linear economy is driven by cheap fossil fuels and by cheap labour. "There is an artificial cheapness when it comes to fossil fuels because the level of subsidy for fossil fuels is about $5 trillion per year," said Mr Webster, who is director of the International Society for the Circular Economy (IS4CE), an independent international academic society set up in 2019. Before that, he was part of the team that set up the Ellen MacArthur Foundation. He pointed out that this put the value of fossil-fuel subsidies at more or less the same level as the gross domestic product (GDP) of Japan. The International Monetary Fund estimated post-tax fossil fuel subsidies at $5.2 trillion in 2017. Japan's is the third-biggest economy in the world. Its GDP in 2019, according to The World Bank, was just over $5.25 trillion. No wonder that the fibres that derive from fossil fuels are cheaper than natural alternatives.

"Prices send a message," Mr Webster said. "All the efforts to move to circularity are being undermined by this distorted market. We have to look hard at these system conditions or it will be very hard to make the degree of shift that policy-makers and everyone in business want to see." He said he would like to see prices "telling the truth" because this would make the market more realistic.

'A one-way ticket to landfill'

All of this appears to lend extra weight to Florian Heubrandner's support of the Fossil Fashion report. Another aspect of it that he echoes is the small share that recycled polyester has of the overall polyester market and, within that, how little of the recycled polyester comes from used clothing rather than plastic bottles. The "recycling red herring" is the term the report uses to describe this.

"With consumers having greater awareness of sustainability, brands have been quickly finding ways to uphold their eco-credentials through using recycled polyester in their clothing," Mr Heubrandner explains. "Currently, almost all recycled polyester comes from recycled bottles, mostly in a closed-loop system. Yet, diverting bottles from a closed-loop system and turning them into polyester for clothing is actually a one-way ticket to landfill and a risk of perpetuating downcycling. Another concern is the risk of brands greenwashing their image by using materials such as bottles, fishing nets and ocean plastic to make their clothes. Garments made from plastic waste do not lower the plastics crisis or stop the flow of plastics into the environment."

Other reports presenting alternative views are also available, of course, and it can be hard for consumers to know which ones to pay most attention to. "There is an abundance of readily available information on the web," Mr Heubrandner agrees. "Textile and fashion industry practitioners, brands and consumers are spoiled for choice. As a company that has been involved in the manufacturing of sustainable fibres for the textile and fashion industry for more than 80 years, we at Lenzing, have learned from experience that the key to empowering the industry and consumers to make informed choices is transparency." He says a public commitment to global standards aids transparency.

What he refers to as conscious consumerism is having a great impact on many different aspects of life now and, inspired by this, he says the Austrian fibre manufacturer is working closely with industry counterparts and campaign groups to champion transparency through industry education within the supply chain, especially on raw material sourcing and sustainable production process assessments. Retailer education activities are also ongoing, providing brands and retailers with knowledge of what goes into making products and labelling that will help them explain this to consumers. There is also direct consumer education, conducted through sharing relevant information on raw material and products to help consumers make informed decisions.

Lenzing's vice-president for textiles, Florian Heubrandner.

Innovation drive

Moving on to the third of the major trends, he says innovation will drive the industry's zero-carbon vision. Mr Heubrandner explains that an urgent need to rethink the fashion industry's carbon output has arisen. This, in turn, has encouraged brands "to double down on efforts to innovate, increasing demand for alternatives to synthetics". Not long ago, fossil fuel-derived synthetic fibres were the "alternatives". These were the products that meant innovation and the future. Now we have important companies calling for alternatives to the alternatives. He points out that, as in other industries, innovation in the textile and fashion industry is ongoing. New fibre types come along and companies adopt new production processes with the aim of enhancing sustainability. At the same time, new technology from outside frequently comes into the industry and makes a difference. Blockchain, with its ability to help trace the origins of products, is a good current example.

Florian Heubrandner continues: "Synthetics are big in terms of volume. That's why we need to increase supply and demand for natural alternatives and most importantly, develop true circularity solutions beyond polyester recycling. As brands and consumers become more aware of the negative impact we are having on the planet, the need for alternative materials and alternative ways to minimise impact will continue to grow. "

His view is that sustainable plant-based fibres, such as those Lenzing produces, could provide a good alternative in the years ahead because, he says, they offer comfort, durability and "sustainability guarantees" (please see the separate article on page 16 of this issue of *WSA* on manmade cellulosic fibres). He adds that innovation must also focus on the development of "ground-breaking circularity-minded processes" to reuse water and solvents during production. Some emissions remain unavoidable at present, he concludes, but he says he hopes to see a large-scale push away from "impactful production practices" in the years to come.

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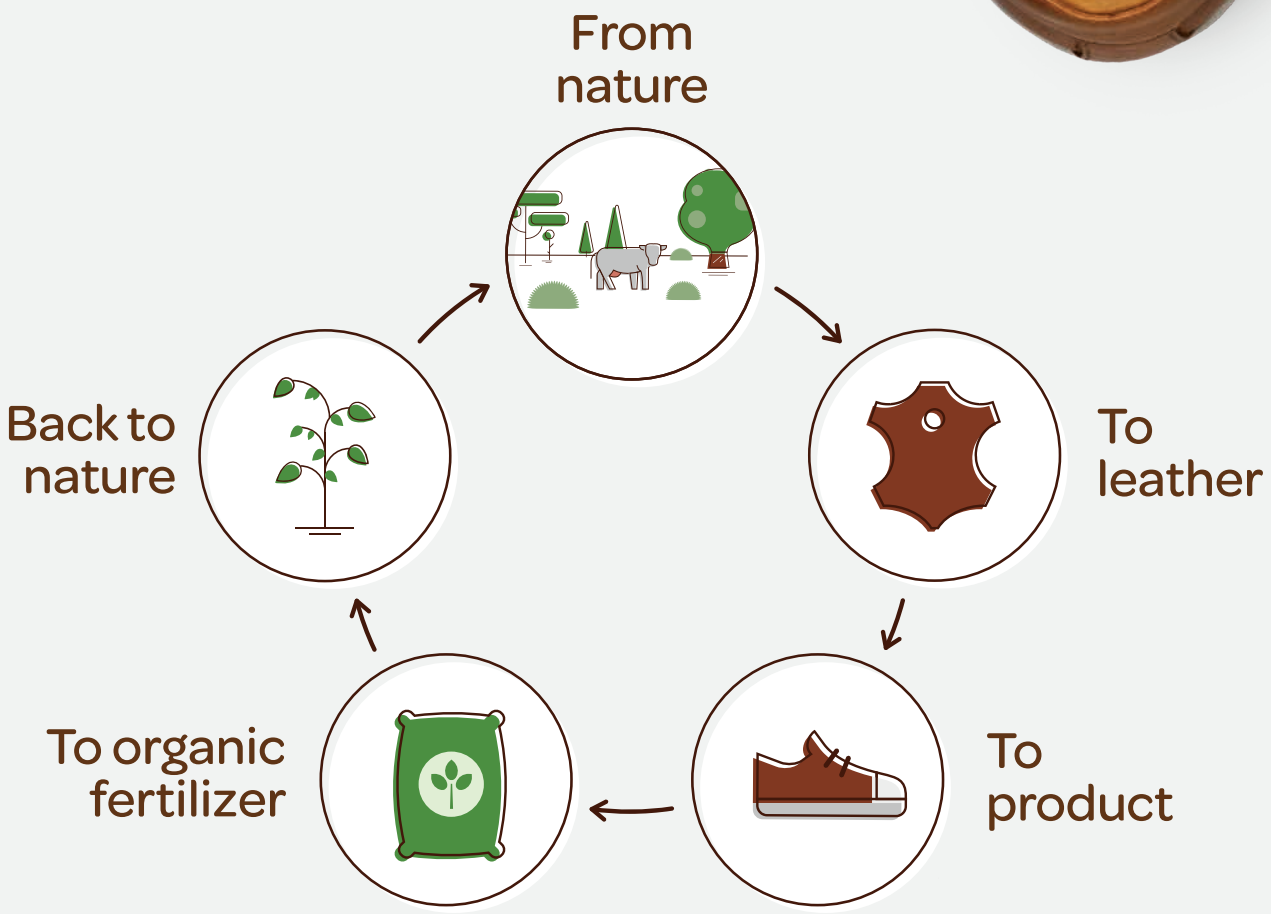

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The art of the sneaker on show

Some trendy styles may 'run' out of stock, some may never leave the box once purchased, but sneakers do have miles of cultural traction. A major exhibition at London's Design Museum, Sneakers Unboxed: Studio to Street, focuses on this ubiquitous shoe, highlighting the sneaker as a universal design object.

Although it began as a humble item of footwear, the sneaker has become a design icon in the 21st century, deserving of an exhibition focused entirely on the creativity behind the style. The London Design Museum has been chosen to host such an event, appropriately called *Sneakers Unboxed: from studio to street*, scheduled to run from this May through to late October.

In past years, the works of an artist could enhance a home, a museum or warrant a solo exhibition, and the most acclaimed were even considered as a sound investment. Today, there are some who see sneakers as an investment, although to many it may be difficult to see what pleasure one might get from looking at a shoe box in which a pair of sneakers is hidden. Though long a staple of art school cool, it is not often that sneakers themselves come under the scrutiny of the 'white cube' of museums.

Sneakers Unboxed spins a fresh web for the footwear stalwart, journeying from New York to Tokyo via California, Cape Town and the United Kingdom. Curated by Ligaya Salazar, an alum of design institutions including London College of Fashion's Fashion Space Gallery and the Victoria and Albert Museum (V&A), the show considers sneakers through two lenses: style and performance (although some eligible models appear under both categories, Ms Salazar tells *WSA*).

The show will certainly be a timely affair. Despite the negative effects of the pandemic on other areas of retail, the exhibition's sponsor, StockX (a Detroit-based online sneakers, streetwear and collectibles marketplace, founded in 2015), recently announced that it is now worth $3.8 billion, up 35% ahead of an expected public listing later this year, according to the *Wall Street Journal*. During the exhibition, visitors will catch a glimpse of a data visualisation piece by StockX, which values the current sneaker resale market at more than $6 billion, plus significant highlights from the resale platform's history, including the Jordan 1 Retro High Dior (2020's "most valuable" sneaker release) and the all-time most traded pair of sneakers, the adidas Yeezy Boost 350 V2 Zebra.

Adidas' Futurecraft. Strung shoemaking robot by Kram/Weisshaar allows for on-the-spot knitting of full shoe uppers.

CREDIT: ADIDAS

Common goods

US investment bank and market research firm Cowen estimated last summer that the global sneaker resale market will reach $30 billion by 2030, with markets outside the United States consuming a significant portion of this pie, tipping the scales at around $19 billion. For the New York-headquartered firm, sneakers are an emerging asset class. Senior

director for Europe at StockX, Derek Morrison, agrees that the footwear has the power to "unlock" economic opportunity for resellers.

Perhaps best underscoring sneaker's pandemic-busting abilities, though, credit broker money.co.uk suggested earlier this year that shoppers' moods — or "positive emotions" — actually increased by 64% following the purchase of sneakers (which, it is inferred, could either be brand-new or second-hand), based on survey data collected from 2,560 respondents over the period spanning February through March 2021. Mr Morrison concurs with this sentiment: "The love for sneakers transcends age, gender and location and, no matter your background, you probably have a connection, memory or story about your favourite pair."

Originally developed by Design Museum curator Shasti Lowton in 2019, Ms Salazar took the reins of Sneakers Unboxed in late 2020, following its postponement due to covid-19 and Ms Lowton taking maternity leave. Whereas Ms Lowton had secured much of the exhibition's content after visiting the archives of many of the major brands and consulting with sneaker designers and collectors, Ms Salazar, who curated the Ecco-sponsored show, Fashion v Sport, at the V&A in London in 2008, largely shaped the exhibitions narrative and planned visitor programme. "I believe that you can't tell the history of sneakers without telling the stories of the people who have popularised them beyond functional sportswear," she tells us.

Form, fit and function

Whether coveted for their form, function or both, the culture built up around sneakers is arguably defined by the sneakerhead, a sneaker aficionado who passionately seeks out exclusivity and uniqueness in design, Ms Salazar explains. Long before limited editions or collaborations became the "norm", she says, some sneakerheads would travel abroad to buy country-specific releases or go through old stock in a sports shop to find standout deadstock or vintage wares. Some still would customise pairs they already owned for fresh appeal.

The exhibition, therefore, begins with the concept of style, profiling the fashions of young people in 1970s New York before encountering early skateboarders in California and then moving on to the experimental 'uniforms' worn by those involved in the British football, casual, dancehall and grime subcultures. Its curated journey in sneaker culture next winds its way down to Cape Town, before charting the rise of early collaborations and limited editions in 1990s Tokyo — "when brands first started to realise their impact", Ms Salazar notes — all the way up to the present, globalised market of international resale and largescale co-creation.

After style comes performance, according to Sneakers Unboxed. This technology-focused aspect of the exhibition's design demands a pivot back to the origins of the sneaker, where eight key, interrelated elements of sneaker-making, such as traction, fit, cushioning and stability, are dissected and considered alongside contextual material including design sketches and material swatches. What is not to be missed, though, is the Design Museum's take on the "most innovative sneakers throughout history", as Ms Salazar puts it, nor its interrogation of what she describes as the most important strategic design concerns of our time: circularity and sustainability.

A sneaker or not a sneaker? That is the question but not designed for performance. An upcycling sneaker design collaboration from UK designers Helen Kirkum and Matthew Needham.

CREDIT: NORMAN WILCOX-GEISSEN

The much-hyped A-Cold-Wall x Nike Zoom Vomero +5 Solarised sneaker will also be on display.*

CREDIT: DESIGN MUSEUM

Think zinc

DIALOGUE

Dr Vikram Gopal, chief technology officer of Ascend Performance Materials.

The chief technology officer of Ascend Performance Materials, Dr Vikram Gopal, has broad experience in the advanced materials industry. He explains here that the combination of polyamide 66 and zinc ions that Ascend has developed in its Acteev technology platform has proved effective in deactivating virus particles.

What's the best way to explain the benefits of polyamide compared to other synthetic fibres?

Polyamide 66 began its life as a replacement for silk fibres in women's stockings. Its high tensile strength and abrasion resistance mean it can be spun into thin fibres and woven into lightweight fabric, and still perform exceptionally well against daily wear and tear. It's wash-fast through 100 washes, it's easily laundered with minimal pilling and it retains superior colour-fastness.

What led Ascend to consider zinc as the basis of antimicrobial and antiviral technologies?

One of our customers was looking for a high-use, anti-odour fibre. When we looked at the market for odour-resistance, much of what was available were topical treatments that lose their efficacy. Because of our fully integrated manufacturing, we had the ability to embed the antimicrobial and odour-resistance technologies within the polymer matrix, effectively locking it in place for the life of the fibre. We considered zinc because it's safer for the environment. Unlike the most commonly used antimicrobial agent, silver, zinc oxide is generally recognised as safe by the US Food and Drug Administration and does not have any harmful effect on the environment or on human health.

Could the world have made better use of textile technology in general in its fight against covid-19?

Given what we know about covid-19 today with regard to masks, PPE and how the virus is transmitted, yes, the world could have made better use of textile technology to fight the pandemic. So we have to prepare for the next one. That will require people to be more comfortable wearing masks in public, especially if they are exhibiting symptoms of illness. To do that, you need comfortable masks that work. It may also require antimicrobials to be more prevalent in day-to-day life, even in ways that people don't necessarily notice. In terms of fabrics, there are a lot of opportunities in transportation, apparel, PPE and accessories. If bus, train or taxi seats are covered in antimicrobial fabric, you can potentially reduce the likelihood that an infection is transmitted by contact on public transportation. If people's garments are antimicrobial, sanitising one's hands could be as simple as wiping them on

a shirt or putting them in a pocket. But even if we are not responding to a pandemic, there is a lot to be said for textiles that inhibit the growth of odour-causing bacteria and fungi. Those textiles last longer and are likely to be worn or used longer. They may also reduce the need for frequent washing, which would save water.

> **"If people's garments are antimicrobial, sanitising one's hands could be as simple as wiping them on a shirt or putting them in a pocket."**

How exactly does Ascend's Acteev technology platform work in combatting covid-19?

Acteev combines zinc ion technology with polyamide-based woven, nonwoven and knit fabrics and yarns. The active zinc ions are embedded into the polymer matrix, providing a long-lasting solution that does not wash away, unlike topical finishes or coatings, and it doesn't use large amounts of water and energy, or generate the waste that many silver-based applications do. The technology has been in development for several years, but with the shortage of articles resistant to microbial growth, Ascend accelerated the product launch by partnering with independent labs for testing and reallocating resources to scale up production. We quickly launched a line of face masks, but our ultimate goal is to partner with brands and manufacturers to expand Acteev's availability. We see an Acteev world with Ascend working with other innovators who want to use our technology to create new and improved versions of everything from surgical masks and N95 respirators to athleisure and personal-care products.

What did you learn from the tests on Acteev-enhanced knitted fabric at the University of Cambridge?

Zinc has long been known for having antimicrobial properties and, in this study, an international team of scientists systematically tested how well a fabric made of polyamide 66 embedded with active zinc ions compared to other synthetics and to cotton at absorbing and deactivating virus particles. In this study, the fabric produced a 2-log, or 99%, reduction of virus particles after one hour. Deactivation of the virus began instantly, with most deactivation occurring between 30 seconds and five minutes. The paper is available for comment on the biology preprint server bioRxiv. There is more work to be done in the area, but these initial results are very promising when it comes to the development of self-cleaning materials.

What is The S Group and how will your alliance help put Acteev into garment collections? What is The S Group saying to its customers about Acteev?

The S Group offers complete supply chain management for apparel brands, including product development, manufacturing, logistics, quality assurance, packaging and order fulfilment. They've worked with some of the world's most recognised brands: Lululemon, New Balance, Mack Weldon and more. Their expertise combined with our high-performance fabric and yarn allows us to very quickly bring to market athleisure, performance, scrubs, and seamless products such as intimates, leggings, active wear, socks and gaiters. Acteev Protect gives their customers a combination of confidence that their products will be safeguarded against odour-producing bacteria and microbes and the design freedom they need. Acteev can work in pastels, bright solids and dark colours. There's no post-finishing step required, so seamless garments are ready after knitting. And it can be used in virtually any application.

One thing we have learned from covid-19 is that people may have to become used to wearing masks in public.

ALL CREDITS: ASCEND

The North Face's flagship store in Seoul, where its regen Jeju collection launched earlier this year.

CREDIT: HYOSUNG TNC

Digging into South Korea's Green New Deal

Famed for its technological innovation, South Korea is now also investing heavily in low-emission, climate-neutral development strategies at a typically fast pace. Moving towards circularity by nurturing a robust recycling strategy appears to be front of mind for the nation's leading textile enterprises.

First proposed by the country's ruling Democratic party, headed up by President Moon Jae-in, in the run-up to the April 15, 2020 parliamentary election, South Korea's Green New Deal is in fact one of two components to the Korean New Deal (consisting of the Digital New Deal and Green New Deal), a government-led programme with an initial budget of ₩160 trillion (around $142.7 billion). Originally intended as a post-covid-19 stimulus plan, the overarching intention behind the scheme is to mitigate against the negative effects of the pandemic, while establishing a roadmap for future low-carbon and climate-neutral economic growth. The Green New Deal encompasses three strategic areas: green urban development, low-carbon decentralised energy and innovative green industry.

Building an innovative, green textile industry was the topic of discussion at two significant textile events held in November of last year. On November 11, the north-east Asian nation's thirty-fourth Textile Day, chairman of the Korea Federation of Textile Industries (KOFOTI), Lee Sang-woon, took to the stage to outline strategies for a greener, increasingly digitised and more collaborative textile industry, including the creation of 36,000 new sector-wide jobs. Later that month, KOFOTI and Korea Chemical Fibers Association (KCFA) livestreamed a joint seminar via YouTube to 270 industry participants on the subject of domestic fibre recycling. Both of these events followed the foundation of a Korean recycled fibre "ecosystem" by KOFOTI, KCFA and the South

Korean government in early November.

Later, this January 2021, KOFOTI unveiled a new search function for sourcing recycled textile manufacturers via existing online database Korea Textile, endorsed by the country's Ministry of Trade, Industry and Energy as part of the United States-Korea Free Trade Agreement. At the time of its launch, the new service offered information on 184 South Korean companies. Amid this climate of change, incubating recycling efforts by two significant domestic fibre producers, Seoul's Hyosung TNC and Daegu-based TK Chemical, have evolved and, in some cases, reached maturity during the first half of 2021.

A germinating idea

Local media began reporting on TK Chemical's K-rPET (rPET, recycled polyethylene terephthalate, and the letter K standing for Korea) yarn, also marketed as Ecolon, in early January. Pursued in partnership with domestic mineral water company Sparkle, outdoor brand BlackYak (a top-five Korean outdoor brand, whom TK Chemical has been working with since 2019), the Korea Circular Resource Distribution Center and multinational Doosan, the fibre producer tells *WSA* that K-rPET is its own initiative, but that it "sometimes" collaborates with government agencies. As *sportstextiles.com* reported at the time, South Korean environment minister, Han Jeoung-ae, visited TK Chemical's plant in North Gyeongsang province to check on K-rPET's progress in February.

The significance of K-rPET is that, as more buyers opt for recycled yarn, less petrochemical derivatives — or plastics — are produced, and existing Korean PET waste is repurposed. (Sparkle collects domestic waste PET bottles, which Doosan then transforms into chips for TK Chemical for the production of K-rPET yarn, which is used by BlackYak for apparel and accessories.) Speaking with the general manager of TK Chemical's polyester business unit, Yoda Kim, *WSA* learnt that the company is currently selling approximately 30 tonnes of K-rPET yarn to local buyers every month. As demand increases in accordance with the government's environmentally conscious outlook, Mr Kim foresees the recycled fibre becoming TK Chemical's main product in the future.

Similarly, Hyosung was moved to sign several government-level memoranda of understanding relating to its production of its proprietary regen (a brand of yarn, released by Hyosung in recycled nylon form as Mipan in 2007) from domestic waste PET bottles last year. In mid April last year, the fibre manufacturer officially partnered with the central Ministry of Environment, Jeju Island's provincial government, green-minded startup brand Pleatsmama and mineral water company Jeju Samdasoo. The result was the fibre regen Jeju, also adopted by The North Face, South Korea (operated by Youngone Corporation), later the same year. More recently, Hyosung joined hands with Seoul metropolitan government and the district offices of Gangnam, Geumcheon and Yeongdeungpo to create regen Seoul from locally collected clear waste PET bottles in late January this year.

A design-led, functional approach to recycled fashion seems to be resonating with South Korean shoppers.

CREDIT: HYOSUNG TNC

Pastures new

Assistant communications manager at Hyosung, Teddy Oh, tells us that the Seoul-based fibre producer is "doing its part to align with" the Green New Deal's objectives. Notably, The North Face (another top-five domestic outdoor brand and a Hyosung partner of over 10 years) released a line of outerwear and activewear dedicated entirely to regen Jeju for spring-summer 2021 in February. Launched from the brand's Seoul flagship store, the "K-Eco" collection included 16 styles of clothing and accessories, made from at least 100 tonnes of recycled PET bottles. Some articles even featured a graphic of a character collecting waste plastic bottles. Mr Oh describes the public's reaction to the line as positive, noting a palpable sense of curiosity among onlookers as to how garments can be made using recycled fibre.

With Pleatsmama, Hyosung's latest goal is to produce 100 tonnes of regen Seoul during the first half of 2021. As more of the capital's districts come onboard, this amount will only increase in the future, Mr Oh says. Regen Jeju and regen Seoul are due to expand nationwide later this year, he reveals, broadening the scope for increased brand participation in Hyosung's circularity projects. The collection, named Love Seoul and unveiled in March, included an athleisure hoodie, leggings and joggers.

Regen Jeju t-shirts by The North Face advertise their beginnings as waste plastic bottles.

CREDIT: HYOSUNG TNC

Combining an educational approach with its sustainable production efforts, Hyosung also released a trend-led, direct-to-consumer micro collection, G3H10, earlier this year, intended to further inform millennial and Generation Z shoppers, in particular, about the company's regen products. Made from a blend of regen (which Hyosung plans to increase to 50%, in terms of overall fibre content) and organic cotton, the initial offering of hoodies and sweatshirts was launched via Korean crowdfunding platform Wadiz. All G3H10 garments feature regen hangtags, designed to increase consumer familiarity with regen-branded yarn.

TK Chemical's K-rPET has had further success. Most recently, BlackYak released Plustic (a portmanteau of the words plus and plastic) in April, a new collection including t-shirts, jackets, trousers and a safety bag derived from the recycled yarn. Earlier, in February and March, the technical outdoor brand inked deals with Seoul's Mapo and Eunpyeong districts — adding to its existing partnerships with the capital's Gangbuk and Jongno areas, as well as with the cities of Gangneung and Samcheok in Gangwon province — to broaden its feeder base of domestically discarded PET bottles, for transforming into K-rPET.

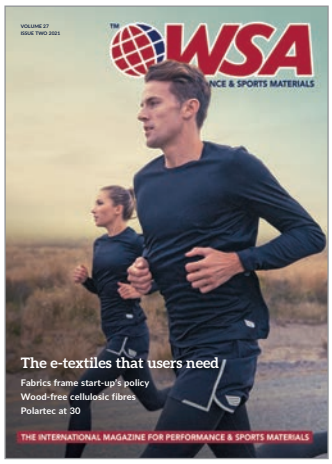
Innovative and green are two words that could describe BlackYak's pioneering February contract with GS Retail, the operator of South Korea's GS25 convenience store chain. Intended to establish what the Seoul-based brand's chairman, Kang Tae-sun, described at the time as a "nationwide resource circulation system", the collaboration will in effect play to the strengths of BlackYak's production capabilities and the retailer's wide distribution network of around 15,000 convenience stores to manufacture sought-after, "eco-friendly" clothing and accessories, to be sold via GS25 stores. The aim is to make sustainable products more accessible to consumers, wherever they live.

Into the blue

The next step for Hyosung, Mr Oh tells *WSA*, is to make 100% recycled nylon fibre from ocean fishing nets. In the meantime, though, the company is focusing on the major issue of ocean plastic together with Pleatsmama. The two enterprises signed a memorandum of understanding with the local port authority for the southern cities of Yeosu and Gwangyang in early April, marking the start of Hyosung's regen ocean initiative, which will see the port provide bags for the separation and disposal of transparent PET bottles and then collect these from returning ships. Hyosung's role will be to transform the bottles into regen ocean yarn, which Pleatsmama will subsequently use in the creation of branded clothing and accessories. As a result of its efforts, Hyosung is reportedly hoping to become the first organisation to obtain Control Union's Ocean Bound Plastic certification for recycling on the Korean Peninsula.

Signifying just how in step these projects are with the Green New Deal, a few weeks prior to this, in mid-March, South Korea's ministries of environment and national defence, the national police agency and KOFOTI all attended a pledge ceremony, during which the four bodies agreed to purchase domestic rPET-derived apparel for their uniforms in place of other materials where possible. According to local media reports, the government plans to roll out an obligation to purchase rPET products across local governments, public institutions and other central ministries in the coming months.

MAGAZINES



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