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Theme Story - Fashion Meets Athletics Innovative Functional Materials Leads New Era of Sportswear

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/ THEME STORY /

Fashion Meets Athletics

INNOVATIVE FUNCTIONAL MATERIALS LEADS NEW ERA OF SPORTSWEAR

運動與休閒並存 革新機能材質引領運動時尚新紀元

TEXT / CHERRY LO

PHOTOGRAPHY / HONG KONG DESIGN INSTITUTE, BOSSINI.X, LULULEMON

The 2024 Paris Olympics came to a close, and it has been dubbed "the most fashionable Olympics" ever with team kits of Mongolia, France and other countries creating quite a buzz online. The eye-catching element of sports attire comes into play for visually attractive events such as gymnastics and synchronised swimming, but fashion has to meet function in the designing of these uniforms, so as to enhance and not impede the athletes' performances.

Take cycling as an example, a sport familiar to Hong Kong. The design of a competition uniform involves complex scientific calculations, emphasising functionality and safety. The materials used must be highly elastic, breathable and sweat absorbent to increase the athletes' comfort. Designers also apply fluid dynamics principles to create streamlined designs and minimise protrusions, reducing friction between the athlete and the outfit to improve aerodynamic efficiency. These outfits undergo rigorous testing prior to competitions to ensure they can protect athletes and enhance performance under diverse conditions.

2024 巴黎奧運圓滿落幕，但其討論度仍日益高漲。作為「最時尚的一屆奧運」，各國運動員隊服及比賽服飾亦成為矚目焦點。對於體操、水上芭蕾等著重視覺效果的比賽項目而言，服飾設計固然重要，但其實各項比賽服飾的功能性同樣對運動員的表現有莫大影響。

以香港人較熟悉的單車項目為例，比賽服飾設計經過複雜的科學計算，著重功能及安全性，如需採用彈性高、透氣及吸汗的物料，以提升運動員的穿著舒適度。同時設計師會利用流體動力學原理，為服飾塑造出流線型的設計，並盡量減少突出物，以降低運動員與衣服之間的磨擦，提高空氣動力學效率。戰衣在比賽前需通過反覆測試，確保能在各種情況下也能保護運動員及提升比賽表現。



New gear for the Hong Kong team

Recently, leisure sportswear brand bossini.X announced its sponsorship of the Hong Kong cycling team and collaborated with the Hong Kong University of Science and Technology (HKUST) to develop the team's cycling attire for the Games. Sharon Chong, General Manager of Bossini Enterprises Limited, shared how this collaboration came about, "The group became a sponsor of the Chinese national cycling team two or three years ago. This year, we began sponsoring the Hong Kong team as a continuation of our commitment."

In 2019, the HKUST's laboratory first applied aerodynamics to cycling, using wind tunnel tests to evaluate cycling equipment and train athletes while developing high-performance racing outfits. In recent years, bossini.X has equipped the HKUST's Aerodynamics and Acoustics Laboratory with advanced cycling aerodynamics testing facilities and a 2.5-metre-diameter low-noise sports wind tunnel for development and repeated testing. The aim is to create suits that provide Hong Kong athletes with a technological edge.

This new generation of competition attire gives Hong Kong athletes a significant technical advantage in the Paris Olympics, leading to better performance. This cross-disciplinary collaboration also signals a new trend in the future development of sports gear.

Further breakthroughs

The brand has developed new exclusive fabric materials for the Hong Kong cycling team, achieving significant breakthroughs in competition attire. The fabric is more elastic and breathable in certain areas, allowing cyclists greater flexibility. The laboratory performed wind tunnel tests on actual athletes, combining supercomputers and 3D scanning technology to calculate their body shapes and fluid dynamics characteristics accurately. Adjustments were made based on individual postures to optimise their performance.

Instead of going for standard-sized cycling attire, bossini.X custom-made each competition outfit for the Hong Kong cycling team members, ensuring each athlete competes confidently and comfortably. After repeated testing, Professor Zhang Xin's team at the HKUST confirmed that the brand's newly developed cycling suit effectively reduces wind resistance by 3%, an improvement over the traditional 2% reduction. Hong Kong team

representatives have already worn this new cycling suit at the 2024 UCI Track Cycling Nations Cup in March.

To enhance athlete training, last year, the Hong Kong Design Institute's Centre of Innovative Material and Technology (HKDI CIMT) developed a wearable sensor device, "PostureSense", which uses detachable woven material straps attached to sports shirts to monitor cyclists' riding posture, preventing injuries and improving overall performance. This innovative design won the bronze medal at the 48th Geneva International Exhibition of Inventions and the Red Dot Award: Design Concept 2023 — the latter is often referred to as the "Oscars of the Design World" for its prestigious status. The HKDI CIMT team is currently showcasing an improved second-generation version and negotiating a collaboration with a mainland cycling sportswear brand, which sponsors more than 50 cycling teams worldwide. They plan to test the straps on athletes, incorporating features to measure heart rate, respiration and body temperature.





Leisure sportswear brand bossini.X announced its collaboration with the Hong Kong University of Science and Technology (HKUST) to develop cycling attire for the Olympics.
休閒運動服裝品牌 bossini.X 與香港科技大學合作，研發出提升運動員表現的奧運戰衣。

The HKDI has also teamed up with cycling sportswear brand Santic to co-organise a student design competition, integrating the project into the advanced diploma fashion design course, which attracted more than 80 students. The students in this course created distinctive cycling sportswear using classic cycling culture and surrealism as their design directions. Professional judges selected five finalists, and Santic helped bring to life the students' designs, which were showcased at the HKDI graduation exhibition. This collaboration gave students valuable practical experience, from design conception to final production, broadening their horizons and cultivating their professional abilities.

In future major competitions, the Hong Kong cycling team will be able to leverage cutting-edge advancements in fabric technology, 3D scanning and fluid dynamics analysis. Their state-of-the-art gear will blend innovation with bespoke tailoring, rigorous wind tunnel testing and wearable posture monitoring devices. These improvements promise to bring more glory to Hong Kong and its athletes.

Athleisure trend

Since the 1980s, athleisure has gradually entered the mainstream market, and in the 2010s, it caught on fed by celebrity pictures on social media. In the post-pandemic era, as people increasingly prioritise health, more individuals are adopting exercise habits like hiking and yoga, leading to a transformation in global sports leisurewear brands. Sportswear is no longer limited to exercise — it brings the wearer the best of all worlds: fashion, comfort and functionality. For example, lululemon, founded in 1988 and originating from North America, has developed a variety of proprietary fabrics, such as the quick-drying, breathable and highly stretchy

Nulu fabric and the wrinkle-resistant, breathable and stretchy Warpstreme fabric.

Meanwhile, outdoor sports equipment brand BOA, founded in the Colorado Rockies, has developed the revolutionary patented BOA Fit System. The brand has an independent Performance Fit Lab, with a team of designers, prototype makers, engineers and biomechanics experts conducting independent scientific research both in labs and rugged outdoor terrain. The brand spends over 400 hours annually evaluating elite athletes' performances to collect data. The patented design used in sports and mountaineering shoes, BOA PerformFit Wrap, encloses and fits the midfoot and locks the heel. Scientific testing has confirmed that the design accelerates athletes by 1.5%, reduces ankle rotation speed by 7%, enhances overall stability, and boosts speed, agility and endurance.

In recent years, the general public has raised their awareness on health and wellness, leading to the athletic and leisure elements also becoming a prominent fashion statement. Sports leisurewear will undoubtedly become one of the most prominent fashion elements. With more sports-related technologies emerging, the future will see diverse sports leisurewear that meet contemporary consumers' comprehensive demands for comfort, functionality and aesthetics, allowing both athletes and the public to showcase their confident and stylish side.



**"Some people want it to happen,
some wish it would happen, others make it happen."**

MICHAEL JORDAN

American businessman and former professional basketball player



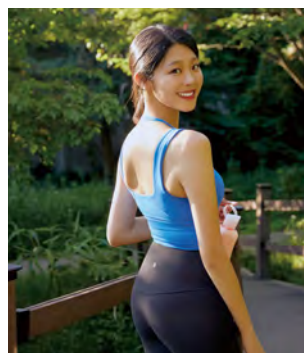
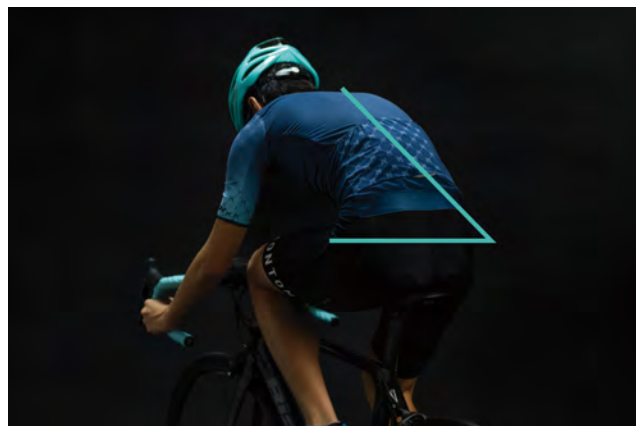
港隊新戰衣

早前，休閒運動服裝品牌bossini.X 宣佈成為香港單車代表隊的服裝贊助商，亦與香港科技大學合作，研發出迎戰奧運的騎行服。Bossini 總經理 Sharon Chong 與我們分享研發港隊騎行服的緣起：「集團早於兩、三年前已成為與國家單車隊的贊助商。直到今年我們亦開始贊助港隊，希望作為延續。」

早在 2019 年，香港科技大學實驗室首度將空氣動力學應用於單車運動員，透過風洞測試測試單車器材、訓練運動員，同時研發高性能比賽戰衣。近年，bossini.X 在香港科技大學的空氣動力學與聲學實驗室中，配備先進單車空氣動力學測試台，並利用 2.5 米口徑低噪音體育風洞作研發及反復測試，務求為一眾港將研發出帶來更高技術優勢的戰衣。新一代的比賽服，令港將在比賽中增添不少技術優勢，為香港爭取更佳成績。這樣的跨界合作無疑也昭示了未來體育裝備發展的新趨勢和模式。

再作突破

這次品牌為香港單車隊研發出新的獨家織物材料，在賽服上取得重大突破。面料不僅彈性更好，部份位置亦更加透氣，令運動員比賽時拉伸比率更高。實驗室內亦有騎行模型與真正運動員參與風洞測試，結合超級計算機及 3D 掃描技術，精準計算出運動員的身型和計算流體動力學特性，並根據運動員個人姿勢作出專門調整，為運動員締造最佳狀態。



To enhance athlete training, last year, the Hong Kong Design Institute's Centre of Innovative Material and Technology (HKDI CIMT) developed a wearable sensor device, "PostureSense".

去年香港知專設計學院的HKDI知專設創源 (HKDI CIMT) 研發出穿戴式傳感裝置「PostureSense」。

有別於一般單車騎行服的標準尺寸，bossini.X 為香港單車隊成員度身訂造每件比賽服，確保每位運動員都能在最自信舒適的狀態下比賽。經反覆測試後，科大張欣教授團隊證實，品牌研發的全新騎行服有效降低 3% 的風阻，比起減少 2% 的傳統技術更進一步；而早於 3 月，港隊代表便已率先穿上全新騎行服出戰 2024 UCI 國家盃場地單車賽，並於巴黎奧運單車場地賽中，再度披上這套新戰衣應戰。

就提升運動員的訓練成效，去年香港知專設計學院的HKDI知專設創源 (HKDI CIMT) 亦研發出穿戴式傳感裝置「PostureSense」，透過扣於運動上衣的可拆式編織物料背帶，監測單車運動員的騎姿勢，預防受傷及提升運動員整體表現。這一創新設計先後勇奪第 48 屆日內瓦國際發明展銅獎，以及被譽為「設計界奧斯卡」的「2023 紅點設計概念大獎」，備受國際肯定。現時HKDI CIMT 團隊正展出經改良的第二代版本，並與一個贊助全球超過 50 隊單車隊的內地單車運動服裝品牌洽談合作，計劃安排運動員試用背帶，並加入量度心率、呼吸及體感溫度等多種監測功能。

早前，HKDI 亦與單車運動服裝品牌 Santic 合辦學生設計比賽，並將項目融

入時裝設計高級文憑課程中，吸引 80 多名學生參與。學生以單車經典文化及超現實主義為設計方向發揮創意，設計出各具特色的單車運動服裝。最終專業評審選出五名入圍設計師，由 Santic 實際生產並在 HKDI 畢業展上展出。這次合作為學生提供寶貴的實踐機會，體驗從設計構思到成品生產的全過程，拓寬學生視野並培養他們的專業技能。

相信在未来的重大賽事中，通過先進的面料研發、3D 掃描和流體動力學分析，結合定制裁剪和風洞測試，同時配合可穿戴式的姿勢監測設備，香港單車隊將以全新的裝備和技術優勢，爭取更出色的成績。

運動休閒風潮

自上一世紀 80 年代起運動休閒風 (athleisure) 已逐步進入主流市場，並於 2010 年代開始普及。尤其疫情之後，大眾開始更注重健康，越來越多人開始培養行山、做瑜伽等運動習慣，全球均迎來運動休閒服飾品牌的轉型。運動服飾不再只局限於運動時穿著，甚至成為集時尚、舒適與功能性於一身的潮流指標。我們日常生活中隨處可見人們以單車褲配 T 恤，或是瑜伽褲等運動休閒風格的服飾。這一轉變，反映了當代消費者對於舒適、時尚與功能性的綜合需求。以創立於

1988 年、源於北美的運動服飾品牌 lululemon 為例，研發出多種自主研發的布料，如快乾透氣、良好延展性的 Nulu 面料，以及抗皺透氣、適合拉伸的 Warpstreme 布料等。

與此同時，創立於科羅拉多落基山脈的戶外運動用品品牌 BOA，研發出革命性的專利系統 BOA Fit System。品牌設有獨立的 Performance Fit Lab「性能合身系統實驗室」，擁有具備設計師、原型製作者、工程師及生物機械學家團隊，於實驗室及崎嶇的戶外山地開展獨立科學研究。品牌每年花超過 400 小時，評測精英運動員的表現以收集數據。當中用於運動及登山鞋的專利設計 BOA PerformFit Wrap 可包裹並貼合足中段及鎖住後跟。經科學驗證及反覆測試後，證實設計可加快運動員 1.5% 速度，同時降低 7% 的踝關節旋轉速度，提升整體穩定性，增強運動員的速度、敏捷度及持久力。

近年大眾日益注重健康，運動休閒服飾亦成為矚目的時尚元素。隨著更多運動相關創新科技面世，相信未來將出現更多元的運動休閒服飾，它不僅是一種時尚選擇，更是滿足當代消費者對於舒適、機能與美學的綜合需求，同時讓運動員與大眾都能藉此展現更自信時尚的一面。