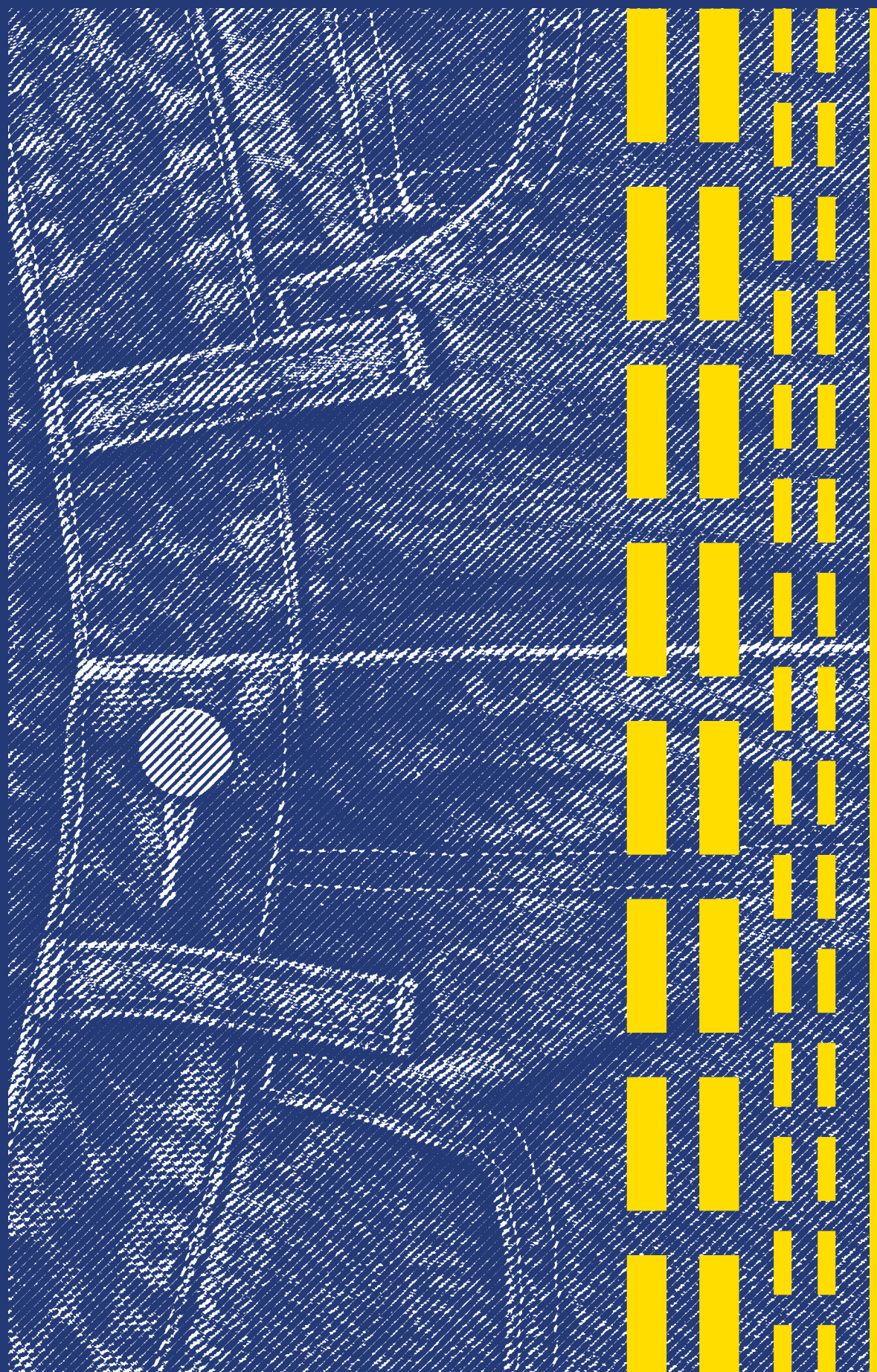
WINTER 2023

FABRICA. WEAVE

5TH ANNIVERSARY DENIM EDITION

五週年牛仔特集



DENIM CULTURE AND COMMUNITY
牛仔文化及其社群

REDUCE:
CIRCULARITY IN DESIGN AND ITS PRACTICE
減低廢棄：
循環設計及其實踐

REUSE & UPCYCLE:
LOCAL AND BEYOND
重用與升級再造：
本地及國際例子

RECYCLE:
NEW GENERATION SUSTAINABLE FIBERS & INNOVATIONS
循環再造：
新世代可持續纖維及創新方法

SUSTAINABLE DENIM EDUCATION IN ASIA PACIFIC INITIATIVE
亞太地區可持續牛仔服
教育倡議

南豐作坊
the mills fabrica

Welcome to Fabrica.Weave! In each edition we bring to you interviews, insights and practical information about the techstyle world (companies at the intersection of technology and lifestyle).

感謝您閱讀南豐作坊的通訊！我們將送上不同的訪問與觀點，以及實用的業界資訊，帶您投入科技與生活時尚之間的techstyle 世界。

WINTER 2023

THE MILLS 5TH ANNIVERSARY — DENIM EDITION

南豐紗廠五週年 — 牛仔布特集

Cover Image Courtesy: Unsplash

EDITOR'S NOTE

編者的話

This Denim Edition is themed around denim as a forever young and classic garment. From the first pair of jeans that was born over one century ago, denim has been and remains a historical and cultural symbol. But at the same time, the growth of cotton, the dyeing process of denim, and the production of denim garments, all have contributed to significant damage to the environment and all living things on earth. Some textile and garment companies have initiated different projects hoping to tackle environmental pollution and the over-production of denim, to promote a more sustainable denim industry.

Denim is never just another type of fabric. Fabrica.Weave has invited the founder of Fashionary, Penter Yip, to share with us the reasons why denim garments remain the most popular items in fashion and pop culture, and how Hong Kong has developed a unique relationship with the industry.

Well-established companies and startups attempt to tackle environmental threats across the different stages of denim and jeans production. Circularity in design can be facilitated through innovative methods like made-to-order jeans that reduce the chance of producing ill-fitted jeans, or classic jeans that are upcycled into contemporary cuttings. Kay Wong from Fashion Clinic shares how they have turned Calvin Klein jeans inventory into a Hong Kong exclusive capsule collection.

There are also innovations in sustainable fiber, textiles and dyeing, such as an alternative to the traditional dyeing process that reduces water pollution, replacing toxic dyeing chemicals with microorganisms, heat-dissolvable materials that facilitate the garment dismantling process, etc. Dennis Hui and Michael Kininmonth from TENCEL™ Denim Team of Lenzing Group share their new indigo dyeing technologies that can greatly reduce the ecological footprints of denim products.

This issue of Fabrica Weave also talks to David Tring, the Denim Head of The Magic of Denim Consultancy, on the sustainability and the future of denim education in Hong Kong and Asia and the new initiative co-presented with The Mills Fabrica, and Advance Denim.

This edition is celebrating the 5th anniversary of The Mills & Fabrica, which also pays special tribute to the heritage and history of the Nan Fung Group. Starting from the 1950s, Nan Fung Textiles had been one of the keen cotton mills in Hong Kong that ventured into denim production during the 1980s and embraced the global denim culture. The Mills Fabrica will carry on to serve as a platform to accelerate techstyle innovations for sustainability and social impact.

本期以永遠年輕又經典的牛仔布作為特集主題。第一條牛仔褲面世至今超過一百年，盛載了橫跨多個年代的歷史及文化意義。但與此同時，由種植棉花、漂染牛仔布，以至製造各類牛仔服飾的過程而對環境及生物造成的傷害，近年一直被人詬病。有見及此，不少紡織及成衣公司紛紛致力進行各種研究，希望藉由科技，以創新的方法減低牛仔行業的污染及過度生產問題，共同推動更高可持續性的牛仔工業。

牛仔布從來不只是一種布料。Fabrica.Weave 邀得 Fashionary 創辦人 Penter Yip 談談牛仔服飾為何是時尚和流行文化中的長青單品，以及與香港的獨特關係。

傳統及初創企業分別以不同切入點去處理製作牛仔布料及衣飾中各個階段的污染問題。例如引入循環設計的概念，從源頭減少生產過量不合身的牛仔褲，或是以升級再造的方式把舊款滯銷的牛仔褲改成現代剪裁。Fashion Clinic 的 Kay Wong 分享了如何將倉底 Calvin Klein 牛仔褲轉生成全新限定系列。

另外亦有不少創新的可持續纖維、紡織品及漂染方法，例如全新的成衣染色替代方法減低水污染、以生物科技取代有毒化學染料、提升紡織品回收率的可溶解物料等；蘭精集團天絲™ 牛仔系列成員 Dennis Hui 和 Michael Kininmonth 亦分享了團隊致力研發及推廣的全新靛藍染色技術，大幅減低牛仔產品的生態足跡。

本期 Fabrica.Weave 亦專訪了 The Magic of Denim Consultancy 牛仔部門主理人 David Tring，談談香港和亞洲的可持續牛仔教育，以及與南豐作坊及 Advance Denim 共同提案。

適逢南豐紗廠及南豐作坊五周年，本特集特別向南豐集團的承傳及歷史致敬。南豐紡織於五十年代成立不久即成為香港重要的紡織廠之一，並於八十年代牛仔文化風行全球之時，推出自家紡織的牛仔布。我們將繼續以承先啟後的精神，推動具社會效益的可持續紡織科技。

Image Courtesy: picture via Canva.com

INTRODUCTION

導言

Popular among cultures and across decades, denim is arguably the most famous fabric on the planet. Jeans — regular or relaxed, tight or loose fit, baggy or boot cut, remain the most popular fashion item dominating people's closets across continents. The whole journey of producing each pair of jeans, however, has raised concerns in terms of the pollution and harm caused to the planet and the workers involved at different stages of production.

Each process, from the growing of cotton, which is highly water intensive, to the highly polluting indigo dyeing process, and the over-production of garments have led local and overseas startups to actively contribute to making denim and more sustainable fabrics that cause less harm to the environment.

牛仔布在不同文化及年代都大受歡迎，可說是地球上最大名鼎鼎的紡織品。不論是標準或稍鬆、緊身或鬆身、寬鬆或喇叭腳，牛仔褲都是世界各地人們衣櫥中必備的時尚服飾。然而，生產牛仔褲的整個過程，都為地球造成污染，同時危害生產工人的健康。

製作牛仔服飾的過程非常不環保，從高度耗水的棉花種植，到高污染的靛藍染色，加上過度生產，每一個步驟都促使本地和海外的初創企業，製造更加可持續的牛仔布和其他紡織品，積極地減低對環境的傷害。

PRODUCTION PROCESS OF A PAIR OF JEANS AND ITS ENVIRONMENTAL IMPACTS

一條牛仔褲 生產過程及對環境的影響

STEP 1

GROW COTTON
棉花種植

Among all agricultural commodities, cotton uses the most water

在所有農產品中，棉花的耗水量最高

（WWF）

7,600 LITRES OF WATER PER JEANS

Water intensive: 7,600 liters of water are required to make 1 pair of jeans

高耗水量：製作 1 條牛仔褲需要 7,600 升水

（Mukherji, 2020）

Fertilizers and pesticides cause harm to soil and water quality, and biodiversity within and downstream of fields

肥料和殺蟲劑對土壤、水質、農地及其下游的生物多樣性造成危害

（WWF）

STEP 2

HARVEST COTTON & WEAVE IT INTO THE FABRIC TO ENTER THE DYEING PROCESS
棉花收成，編織成布料並進入染色過程

STEP 3

GIVE THE DENIM FABRIC A "WORN" TEXTURE
為牛仔布營造破舊外觀

Water pollution: dyes that release harmful chemicals to the environment and workers

水污染：對環境和工人釋放具有害化學物質的染料

"Sandblasting" process of weathered jeans may cause health risks* to the workers with the fine dust particles

營造破舊牛仔褲外觀的「噴砂」過程產生的細小灰塵顆粒，可能對工人造成健康風險 *

* World Health Organisation has confirmed that the aggressive process of sandblasting leads to incurable diseases like lung fibrosis, emphysema and silicosis among factory workers

世界衛生組織已經證實，惡性的噴砂過程導致工廠工人患上肺纖維化、肺氣腫和矽肺等不治之症

STEP 4

CUT, ASSEMBLE & SELL
裁剪、縫紉和售賣

92 million tons of textile waste are being thrown away annually. Blended textiles, such as polycotton, are traditionally difficult to separate and thus, impossible to recycle

每年被棄置的廢棄布料高達9,200萬公噸。混合布料如科技棉 polycotton 等都難以分拆所以不能被回收

(Preferred Fiber & Materials Market Report 2021. Textile Exchange, 2021. Chen, Xuandong, et al. "Circular Economy and sustainability of the clothing and textile Industry." Materials Circular Economy 3 (2021): 1-9.)

92,000,000 TONS OF TEXTILE WASTE PER YEAR

With 80 billion new pieces of clothing made every year and less than 1% of the global fiber market made from pre and post-consumer recycled textiles

市場每年生產 800 億件新衣服，未使用或已用過的回收布料佔全球紡織市場少於百分之一

THE DENIM FABRIC AND JEANS MARKET TRENDS

牛仔布和牛仔褲 市場趨勢

3.5 BILLION JEANS PER YEAR

Over 3.5 billion pairs of jeans are produced worldwide each year

全世界每年生產超過 35 億條牛仔褲

(Muthu, Subramanian Senthilkannan, ed. Sustainability in Denim. Woodhead Publishing, 2017)

29 BILLION USD IN 2030

Valued at USD 18.1 Billion in 2021, the Global Denim Fabric Market Size is projected to grow to USD 29.4 Billion in 2030, at a CAGR of 4.4%

2021 年，全球牛仔布市場規模已達到 181 億美元，預計到 2030 年將增長到 294 億美元，複合年增長率為 4.4%

(Spherical Insights & Consulting, Oct 2022)

79% ASIA-PACIFIC

Asia-Pacific's denim fabric market size accounted for 79.2% of the total denim fabric market share in 2020 and is projected to witness growth at a CAGR of 4.6% during the forecasted period

亞太地區的牛仔布料市場佔 2020 年牛仔布料市場總額的 79.2%，預計將以 4.6% 的複合年增長率增長

(Allied Market Research, 2021)

↑125% USE OF RECYCLED COTTON

Products containing organic cotton components have seen a 17% year-over-year (YoY) growth, with organic cotton using 91% less water to grow than conventional cotton, which also avoids the use of chemicals and pesticides. Recycled cotton has also seen 125% YoY growth, and the next challenge would be how we could further recycle after blending with other fibers to improve its quality

含有有機棉成分的產品按年增長了 17%，而有機棉的種植用水量比傳統棉花少 91%，過程亦不會使用化學品和殺蟲劑。再生棉實現了 125% 的按年增長，下一個挑戰將是如何進一步回收與其他纖維混紡的棉布料

(Edited, 2022)

↑32% WATERLESS DENIM

Waterless denim is the new global trend. The number of waterless denim concepts in the U.S. and U.K. leapt 32% year-over-year (YoY)

無水牛仔服裝逐漸成為全球的新趨勢。美國和英國對無水牛仔服裝概念的興趣按年增長 32%

(Sourcing Journal, 2022)

↑80% DENIM SKIRTS AND TOPS

Drawing on the revival of the Y2K trend, the share of denim skirts and tops grows to 80% YoY, and denim shirts are taking share from shorts with a growth of 20% YoY, as catwalks of multiple brands have confirmed that denim miniskirt is a key item of this trend

Y2K 流行回歸，牛仔裙和牛仔上衣的份額同比增長 80%，牛仔襯衫從短褲搶佔份額，同比增長 20%，多個品牌的時裝展已證實牛仔迷你裙是這個趨勢的關鍵單品

(WGSN, 2022 Fall)

In comparison with pre-pandemic, there is a larger diversity of preferences for people in selecting the style of their jeans. The US market saw baggy/loose cut as the most worn style, while boyfriend fit was most popular in the UK market, and relaxed style was preferable in the China market

與疫情大流行前相比，大眾對牛仔褲款式的偏好各有不同。美國市場最流行的款式是鬆身 / 寬鬆剪裁，英國市場最流行「男朋友牛仔褲」，中國市場更偏好稍鬆款式

(Cotton Incorporated, 2022)

BAGGY / LOOSE | **BOY-FRIEND FIT** | **RELAXED STYLE**

DENIM CULTURE AND COMMUNITY

牛仔文化及其社群

When we talk about denim, we are talking about more than simply a type of fabric. Denim is a culture and has embodied a profound spirit that many see it as a symbol of freedom. Thousands and thousands of denim products are designed and produced every day, and choices are innumerable. But through the act of choosing a pair of jeans, a denim shirt, or a jacket, one's personal style and expression can be clearly demonstrated.

牛仔布從來都不只是一種布料。牛仔是一種文化，體現深刻的人文精神，許多人視之為自由的象徵。世界每天設計和生產成千上萬的牛仔服飾，選擇多不勝數，從牛仔褲、牛仔襯衫或牛仔褸的選擇角度，可以充分展示個人風格。

Image Courtesy: Unsplash

"IT WAS NOT UNTIL MARILYN MONROE PUT ON A PAIR OF JEANS IN RIVER OF NO RETURN, A FILM IN 1952, THAT WOMEN'S PANTS WOULD BEGIN TO BE A PART OF MAINSTREAM FASHION."

「瑪麗蓮夢露在 1952 年的電影《大江東去》中穿上牛仔褲後，女性牛仔褲才開始流行，成為主流時裝的一部分。」

Denim has always been closely related to youth culture across generations. From cowboy scenes in Western films made in the 1940s to the overwhelmingly popular **Levi's** jeans on Hollywood bad boy figures like James Dean and Marlon Brando in the 1950s, jeans became a fashion symbol of rebellion and was even temporarily banned from some American public schools. However, they returned in full force and were completely normalized by the 70s with the hippie movement, punk, and hip-hop culture. Denim has always been and continues to be a part of the youth and popular culture.

Jeans were also agents that transcended gender and race. Before there were jeans, long skirts and dresses were the norm in women's clothing in Western society. In the late nineteenth century, women could only borrow from their husbands or brothers for the practicality and durability of the fabrics with copper rivets to hold them together. They would adopt these jeans to ride horses, work on farms and other physically demanding activities.

Though the first pair of jeans tailored for females, "Lady Levi's", was created in 1934, it was not until Marilyn Monroe put on a pair of jeans in River of No Return, a film in 1952, that women's pants would begin to be a part of mainstream fashion.

Blue jeans also served as a political symbol during the demand for voting rights for the African American community in the US in the 1960s. Denim jeans, as observed by fashion writer Zoey Washington, were used as an equalizer to bridge the different genders and "an identifier between social classes". Activists put on jeans and overalls to highlight black poverty and racial caste were among the problems that were worth addressing.

牛仔服飾與不同世代的青年文化息息相關。無論是40年代西部牛仔片中的牛仔場景，還是 50 年代荷李活壞男孩如占士甸和馬龍白蘭度等穿起風靡一時的 **Levi's** 牛仔褲，牛仔褲已成為反叛的時尚象徵，當時甚至有部分美國公立學校禁止學生穿着。然而，牛仔褲在 70 年代全面回歸，並在嬉皮運動、龐克和嘻哈文化的影響下逐漸普及，牛仔服飾與青年和流行文化的關係一直友好至今。

牛仔褲也有跨越性別和種族界限的能量。在牛仔褲誕生之前，長裙和連衣裙是西方社會女性服裝的日常服飾。十九世紀末的婦女會向丈夫或兄弟借用實用和耐穿的牛仔褲，她們會穿著牛仔褲騎馬、在農場工作和進行其他需要體力勞動的活動。

第一條專為女性度身定做的牛仔褲「Lady Levi's」於 1934 年誕生，但要到瑪麗蓮夢露在 1952 年的電影《大江東去》中穿上牛仔褲後，女性牛仔褲才開始流行，成為主流時裝的一部分。

60 年代非裔美國人社群爭取投票權的過程中，藍色牛仔褲成為了一種政治象徵。正如時尚作家 Zoey Washington 的觀察，牛仔褲除了可調和性別之間的不平等，也是「社會階層之間的標識符號」。社運份子穿上牛仔褲和工人褲，以強調黑人貧窮和種族階級觀念是需要解決的社會問題。

Image Courtesy: Shutterstock

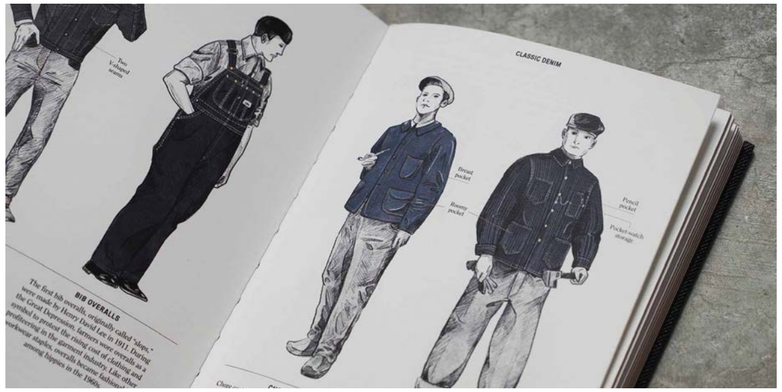


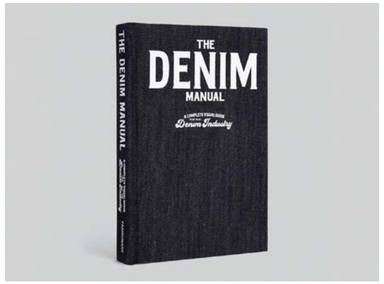
Image Courtesy: Fashionary

HONG KONG AS A SPECIAL HUB OF DENIM CULTURE

香港作為牛仔文化的獨特樞紐

Denim has a unique presence across cultures and time and its ever-evolving character makes it easy to be adapted by individuals according to one's needs and tastes. In 2022, Fashionary published a book on denim, The Denim Manual, which covers the history, fabric, design, washing and care. The founder of Fashionary, Penter Yip, described Hong Kong as a special hub for denim culture in terms of its history and popularity.

牛仔布在不同文化背景及時代都別具代表性，其不斷演化的個性使得每個人都可以根據個人需要和品味找到適合的款式。在 2022 年，Fashionary 發行了《The Denim Manual》，集牛仔布料的歷史、式樣、設計、洗水及保養於一書。Fashionary 創辦人 Penter Yip 形容香港在歷史及流行文化方面，都是牛仔文化的獨特樞紐。



Hong Kong was an important center of denim production in the 1980s, factories in the region produced millions of jeans worldwide. With the significant advantage in the garment production industry, products at a more affordable price were offered to the market, and such edge was further enhanced by the most talented and skilled technicians and workers. The high pace production line and its promising product quality were difficult for other countries to match up with at that time. "This period of rapid growth and success in the denim manufacturing industry not only solidified the city's reputation in the global market but also laid a solid foundation for its vibrant and diverse denim culture that exists even today." As mainland China was one of the largest denim exporting markets, Hong Kong has taken advantage of such location to offer more affordable choices of denim products for everyday use.

Denim is flexible in terms of personal interpretation, which can simultaneously be utilitarian and stylish. "Denim has become a timeless staple in fashion and popular culture worldwide. Its versatility, durability, and comfort make it an attractive choice for everyday wear, from casual street-style looks to chic eveningwear. Denim is widely accepted and embraced by different ethnicities, age groups, and social classes, giving it lasting power in the fashion world."

The committed Hong Kong denim community has curated an interesting and varied cultural scene of its own. Some are vintage denim collectors who like the history and stories that come with each item and would spend lots of effort in hunting for rare pieces. Joined by Penter are Japanese jeans lovers who are drawn to the beauty of details, craftsmanship and garments, which the Japanese see as an art form to create unique and stylish designs that reflect the culture and values of their nation. There are also raw jeans lovers in town who enjoy breaking in their pairs of unwashed or treated jeans and the immergence of unique fading and wearing patterns over time, with every mark having a story to tell.

香港在八十年代是生產牛仔布的重鎮，這裡的工廠為世界各地生產了上百萬條牛仔褲。本地製衣產業的優勢不單為市場提供了實惠的選擇，一眾出色的技術人員及工人亦有助提高利潤。對當時其他的國家來說，要維持高速的生產線同時有質素保證，是非常困難的事。「這段時期牛仔布產業的快速增長及成就不僅奠定香港在全球市場的代表性，也為本地既精彩又多元的牛仔文化立下堅實的基礎。」及至當下，內地成為其中一個最大的牛仔褲外銷市場，香港得以憑此地利提供優質而價格合理的牛仔時尚服飾。

牛仔服飾可以按個人喜好配搭，既實用又時尚。「牛仔布已成為全球時尚和流行文化的永恆主打，集多功能、耐用和舒適的特性於一身，是日常穿搭的必然之選。由休閒街頭風格，到別緻的晚裝，牛仔布得到不同種族、年齡和階層的廣泛喜愛，在時裝界的影響力相當持久。」

香港有一群忠實的牛仔迷在多年來建立出有趣又多元的文化風貌。當中的古董牛仔褲收藏家除了熱愛牛仔衣飾，更着迷於它們的歷史及故事，所以會花上大量心血去尋找罕見的心頭好。日本牛仔褲愛好者如 Penter 則喜歡日本人對細節、工藝及布料的堅持，他們將之視為一種藝術手法，透過別出心裁的設計反映日本的文化和價值觀。另外亦有一些族群喜歡未經洗水或打磨的牛仔褲，他們喜歡從牛仔褲日積月累的穿着過程中，磨出每條有故事性並且獨一無二的紋理。

The "take-make-waste" model — take from the Earth, make a product out of it, and waste it — has been followed by the fashion industry for a very long time. If quality goods eventually end up in landfills, it is not just the products are wasted, but the planet will also soon reach a saturation point. At this time, the idea of sustainability emerged, and the circular economy model was seen as a possible solution.

「取–製–棄」模式——從地球取材，將之製成產品，用完後廢棄——是時裝界長期以來的運作模式。假如一件完好的商品最終被丟往堆填區，不單會造成浪費，亦會令地球更快達至飽和。因此，可持續發展理念於近年興起，當中的循環經濟模式被視為解決問題的方法之一。

Image: Unsplash

REDUCE:

CIRCULARITY IN DESIGN AND ITS PRACTICE

減低廢棄：循環設計及其實踐

CIRCULAR ECONOMY IN PRACTICE

循環經濟的實踐

According to the United States Environmental Protection Agency, a circular economy "keeps materials, products, and services in circulation for as long as possible", where industrial processes and economic activities are regenerative through design, which would allow resources to maintain their highest value for as long as possible. For the fashion industry, there is a famous saying that sustainability can be solved if right decisions are made at the design stage, so circularity really starts with the design. If products are not designed to be reused or turned into something new when they reach the end of their lifecycle, it will not be circular no matter how much you want it to be.

Design is all about solving problems, and when the problem now is to extend the product's lifecycle, to make consumers want to keep liking and wearing the product, it really begins with the education of the next generation of designers. Starting from the initial idea of designing products that can sustain popularity over time, young designers will also have to think about what makes a new brand stand out in a market that encourages less consumption.

On top of training the next generation of designers, how future supply chains are built will also be crucial in encouraging the circularity of the industry. From sourcing and collecting garments from trustworthy factories, to the product development and management of the scale of the collections, the whole idea is to reduce the need to produce more products than consumers require. It is really in the hands of the customers to close the loop of the chain.

根據美國環境保護署的定義，循環經濟「能讓材料、產品和服務盡量保持長時間流通」，工業過程和經濟活動經過設計實現再生，使資源盡可能長期保持最高價值。時裝界有一句名言，「若在設計階段做出正確的決定，就可以解決可持續性的問題」，所以循環實際上是從設計開始的。如果產品不是設計成可重複使用，或在生命週期結束時被改造成新產品，產品循環只是空談。

設計最終目的是解決問題，現在的問題是要延長產品的生命週期，讓消費者一直喜歡和穿着，這一切要先從新一代設計師的教育開始。首先要灌輸的概念，是設計必須經得時間考驗同時保持時尚，年輕設計師還要考慮的，是如何讓新品牌在鼓勵減少浪費的市場中脫穎而出。

除了培養下一代設計師，未來供應鏈的組成方式對鼓勵行業的產品循環也至關重要。不但要從信賴度高的工廠採購和收集衣服，還要兼顧產品開發和系列規模的管理，減低生產多於消費者需求的貨量，最終是要依靠消費者帶動良性循環。

"IF PRODUCTS ARE NOT DESIGNED TO BE REUSED OR TURNED INTO SOMETHING NEW WHEN THEY REACH THE END OF THEIR LIFECYCLE, IT WILL NOT BE CIRCULAR NO MATTER HOW MUCH YOU WANT IT TO BE."

「如果產品不是設計成可重複使用，或在生命週期結束時被改造成新產品，產品循環只是空談。」

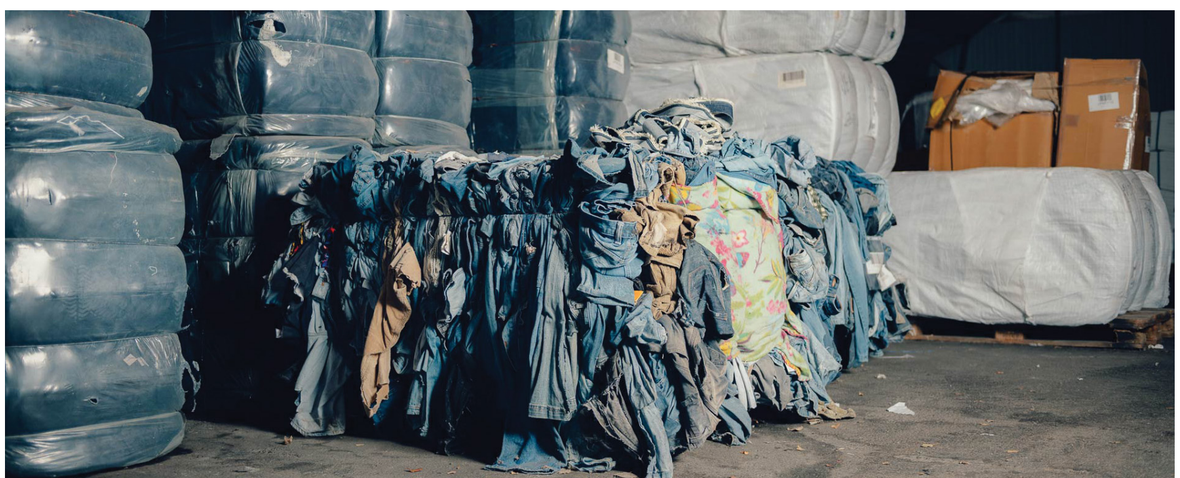


Image Courtesy: Unsplash

TENCEL™ MODAL WITH INDIGO COLOR TECHNOLOGY FOR SUSTAINABILITY

AN INTERVIEW WITH DENNIS HUI AND MICHAEL KININMONTH FROM TENCEL™ DENIM TEAM OF LENZING GROUP

為可持續發展而生的 INDIGO COLOR 技術的天絲™ 莫代爾

與蘭精集團天絲牛仔團隊成員 DENNIS HUI 和 MICHAEL KININMONTH 對談

Dennis Hui and Michael Kininmonth from TENCEL™ Denim Team of Lenzing Group shared their insights on the environmental impact of the denim manufacturing process, and how some of their latest innovations help to reduce water pollution from indigo dyeing.

Lenzing Group believe that modern environmental management should aim to prevent further pollution and should take the "end of pipe" effluent treatment approach, this means reducing chemicals and water used in the growing of indigo plants can prevent leaks into water streams.

To tackle these inherent limitations faced by the denim industry, Lenzing has responded with its latest innovation, the TENCEL™ Modal fiber with Indigo Color Technology, which saves up to 99% of water and electricity, 80% of chemicals and 100% of heat energy, significantly reducing the ecological footprint of denim products. "By adding the indigo pigment during the fiber production stage, the whole indigo dyeing process is eliminated at the warp stage, thus achieving significant savings of water, energy, chemicals, effluent and process time versus conventional indigo dyed products."

The team believes it needs to take a holistic approach to implement sustainability, as it is "a collaboration from field to fiber to finished garment and into the phase of consumer-use". Besides efforts from the industry, governments and consumers both have critical roles to play, e.g. creating legislation in which "companies are accountable and driven to take action against poor labor and environmental practices", and allowing consumers to be exposed to reliable information to make ethical purchases.

針對牛仔布的生產過程對環境所造成的影響，來自蘭精集團天絲™牛仔團隊的 Dennis Hui 和 Michael Kininmonth 將分享其見解，以及能有效減少靛藍染色帶來水污染的創新技術。

蘭精集團認為，現代環境管理需以防止製造更多污染為目標，並採用「末端治理」污水處理方法，以減少在種植藍染所需植物時使用的化學品和水，並阻止污染物洩漏到水流中。

為解決牛仔行業所面臨的局限性，蘭精集團運用其最新的 Indigo Color 藍染技術，製造出天絲™莫代爾纖維，成功節省高達 99% 水電用量、80% 化學品及 100% 熱能，大大減低牛仔產品的生態足跡。「在生產纖維的過程中加入靛藍顏料，能在經紗階段就刪除整個藍染過程，與傳統藍染相比，明顯減少用水、能源、化學品，並減低廢水排放及加工時間。」

團隊深信，實踐可持續性需要「由農地、紡織、到成衣、再到消費者的共同協力」，代表必需採取全面性策略。 除了業界付出努力外，政府和消費者亦能發揮關鍵作用，例如立法以確保「公司需對不利於員工及環境的手法負上責任，並採取相應行動」，同時提供可靠資訊，讓消費者能選擇合乎道德的商品。

TRIARCHY:
RESPONSIBLY-MADE FABRICS AND SUSTAINABLE LAUNDRY TECHNOLOGY

TRIARCHY:
有機布料及可持續洗滌技術

Image Courtesy: Triarchy

TRIARCHY

Triarchy

FOUNDED 2011
成立年份

HEADQUARTERS California, USA
總部 美國加州

TRIARCHY.COM

Humans have used cotton to make clothes for thousands of years. Unfortunately, modern industrial cotton farming uses many pesticides and other harmful chemicals, and chemical residue often remains in the textiles used to make clothing and jeans. **Triarchy's** jeans and denim jackets are produced with responsibly-made fabrics and washed with the most advanced sustainable laundry technology available. The company's denim line is made with a mix of organic cotton and TENCEL™, a natural fibre derived from breaking down trees into pulp and spinning the pulp fibre into a soft, durable textile.

Organic cotton eliminates the use of pesticides and fertilizers, making the fabrics cleaner for the wearer's skin, while also reducing contamination of groundwater. It has been found that the impact of water pollution in the production of organic cotton is 98% lower than that of conventional cotton. Unfortunately, today's organic cotton production only comprises 0.7% of the total global cotton cultivation. If there is greater demand from consumers and manufacturers, wider production and use of organic cotton could be encouraged.

Conventional stretch denim is usually made with some percentage of plastic woven into the fabric for elasticity. This makes stretch denim non-biodegradable and a contributor to microplastics flooding our oceans. Triarchy's new "plastic-free skinny jean" is made from natural rubber instead of plastic. It uses a bio stretch fabric made of 96% organic cotton and 4% natural rubber, created from organic cotton yarns wrapped around a natural rubber core, making the label's stretch denim entirely free from plastics and microplastics, and completely biodegradable.

Triarchy also has a denim line made from 100% cotton vintage denim. The fabric is sanitized in ozone machines before being made into entirely new pairs of jeans and denim jackets. In this way, thousands of pairs of jeans that would have otherwise gone to landfills are repurposed.

人類自數千年以前已使用棉花製造衣物，不幸的是，現代工業化的棉花種植，使用大量殺蟲劑和其他有害化學物質，這些物質有可能殘留在用於製作服裝和牛仔褲的布料之中。**Triarchy** 的牛仔褲和牛仔褸採用可持續的物料，並採用最先進的洗衣技術進行洗滌。品牌的牛仔布系列由有機棉和天絲™ 混合而成，天絲™ 是一種天然纖維，製作過程是先將木材分解成木漿，然後把木漿纖維紡織成柔軟而耐用的紡織品。

有機棉不使用農藥和化肥種植，所製成的布料對皮膚更好，同時減低對地下水的污染。有研究發現，與一般棉花相比，有機棉的水污染程度可減少 98%。可惜的是，現今的有機棉種植量僅佔全球棉花產量的 0.7%。若消費者和製造商有更大需求，就能鼓勵更多有機棉的種植。

傳統的彈性牛仔布通常在織物中織入一定比例的塑膠，以使其具彈性。但這意味彈性牛仔布不可被分解，更有機會變成微塑料污染海洋。Triarchy 最新推出的「無塑膠緊身牛仔褲」由天然橡膠而非塑膠作原料，成份包括 96% 的有機棉和 4% 的天然橡膠，以有機棉紗包裹天然橡膠芯，製作成生物彈性布料。Triarchy 的彈性牛仔布完全不含塑膠或微塑膠，可徹底作生物分解。

除此之外，Triarchy 也有另一個 100% 純棉古典牛仔布製作的牛仔服裝系列，布料會先在臭氧機作全面消毒，然後打造成為全新的牛仔褲和牛仔外套。這個系列讓成千上萬條本應被送往垃圾堆填區的舊牛仔褲，得到循環再生的機會。

HUUE:
USING BIOTECHNOLOGY TO CREATE SUSTAINABLE DYES

HUUE:
以生物科技開發可持續性染料

Image Courtesy: HUUE

HUUE

huue.

FOUNDED 2018
成立年份

HEADQUARTERS California, USA
總部 美國加州

The Mills Fabrica's incubatee
南豐作坊培育公司

HUUE.BIO

The dirtiest and most wasteful part of denim production, the dyeing process causes about 200,000 tons of mainly petrochemical-based dyes (worth 1 billion USD) to be lost annually due to inefficiencies. San Francisco-based startup **Huue** hopes to rectify this problem with pioneering biotechnology that has produced dyes that do not rely on fossil fuels. The company has started with indigo, creating a biosynthetic indigo dye that is five times less toxic when compared with chemical dyes, ensuring that its product is easy for denim makers to implement by making it cost-effective, resource-efficient, and sustainable.

Instead of using toxic chemicals as raw materials, Huue has turned to sugar. Leveraging co-founder Dr Tammy Hsu's UC Berkeley bioengineering research background, the company has come up with proprietary bioengineering to program microbes to secrete certain colours, thereby enzymatically producing bio-dye.

Supported by leading investors and institutions such as IndieBio, Fashion for Good, Jennifer Doudna, and Melinda Gates' Pivotal Ventures, as well as HSBC Asset Management's Climate Tech VC, Huue has secured sufficient financing that will be used to accelerate the commercial scale-up of the company's sustainable indigo dye for fashion industry partners. In the long run, its bio-dyes can even be applied to the food and cosmetics industries.

染色是牛仔布生產過程中最骯髒、最浪費的部分。由於染色技術未達最佳效率，每年約有 20 萬噸石化為主的染料（價值 10 億美元）當作廢水般排放。總部位於三藩市的初創公司 **Huue** 希望通過其開創性的生物技術解決這個問題。Huue 研發的染料不依賴任何化石燃料，生物合成靛藍染料的潛在毒性比化學染料低五倍。它們通過提供具有成本效益、資源高效和可持續發展的產品，確保更容易被牛仔褲製造商採用。

Huue 不利用有毒化學品作為原材料，而是轉而使用糖。共同創辦人 Tammy Hsu 博士具有加州大學伯克萊分校的生物工程研究背景，帶領公司研發出專利生物科技，為微生物進行編程使其分泌特定顏色，以酶催化方式生產生物染料。

得到 IndieBio、Fashion for Good、Jennifer Doudna 和 Melinda Gates 的 Pivotal Ventures 以及滙豐投資管理的「氣候科技創業投資」等投資者和機構的支持，Huue 已獲得足夠的融資，加速商業規模化，為公司的可持續靛藍染料找尋合適的合作夥伴。展望將來，它們的生物染料甚至可以應用於食品和化妝品行業。

JEANOLOGIA: ALTERNATIVE GARMENT DYEING MACHINES THAT REDUCE WATER POLLUTION AND CHEMICALS

JEANOLOGIA:
成衣染色替代方案 減少水污染與化學品

Image Courtesy: Jeanologia

JEANOLOGIA

Jeanologia
THE SCIENCE OF FINISHING

FOUNDED 1994
成立年份

HEADQUARTERS Valencia, Spain
總部 西班牙華倫西亞

JEANOLOGIA.COM

Spanish company **Jeanologia** specializes in the science of finishing. With a mission to create "an ethical, sustainable, and eco-efficient textile industry through disruptive technology and their know-how", they are committed to eradicating one of the most polluting practices in the industry, the traditional garment dyeing process.

Jeanologia has developed the ColorBox, a series of garment dyeing machines which serve as an efficient and sustainable alternative. The machinery that covers all types of production, from development centers and small productions to large-scale productions and retail, reduces not only the pollution load of wastewater but also the resources for the dyeing process, which can reduce the water and chemicals required by up to 60%.

The technology behind Colorbox is to combine a low liquor ratio (1:2–1:4) process with nanobubbles that use air instead of water for some of the steps to reduce required resources. To avoid reprocessing, the use of automated digital solutions ensures that the dyeing process is "right at the first time". This also is a way to tackle the excessive use of resources in traditional garment dyeing.

Jeanologia has been joining forces with brands and suppliers as a technology partner to offer their know-how, hoping to lead the change in the production model to offer alternatives to facilitate faster and more controlled and sustainable textile production.

來自西班牙的 **Jeanologia** 專注研究紡織品加工處理技術，並視「通過顛覆性技術及專業知識，去創造一個具道德、可持續、且高生態效益的紡織業」為重任，一直致力於徹底消除紡織業上構成最嚴重污染的項目——傳統成衣染色。

Jeanologia 成功開發一系列名為 ColorBox 的紡織品染色機，其可持續性能取代傳統染衣方式，而且效率更高。這嶄新的機器可應用於所有類型的生產，由產品開發、小型生產、到大規模生產及零售等，不單有效降低廢水污染程度，更大減染色過程中耗用的水和化學品高達 60%。

其技術是將紡織品與染液比率調低（1:2–1:4），並結合納米氣泡，讓染色過程應用空氣而非水，以減少資源耗費。此外，為避免再度加工，自動數碼化亦能確保染色過程「一次到位」，有效解決傳統成衣染色時過度使用資源的問題。

Jeanologia 一直與多個品牌和供應商合作無間，為他們提供專業知識，從而帶動生產模式的變革，以全新的方法與技術，促成更快、更可控和可持續的紡織品生產。

UNSPUN: MADE-TO-ORDER JEANS TO REDUCE OVERPRODUCTION

UNSPUN:
減少過量生產的度身訂造牛仔褲

Image Courtesy: Unspun

UNSPUN

unspun

FOUNDED 2015
成立年份

HEADQUARTERS California, USA
總部 美國加州

The Mills Fabrica's portfolio company
南豐作坊投資公司

UNSPUN.IO

Unspun's mission is to make the design, manufacturing, and consumption of fashion intentional. It aims to scale back the clothing industry's predilection for overconsumption and overproduction. The industry always tempts consumers to buy more by offering new styles and designs at shorter and shorter intervals.

The clothing industry as it stands today is massively wasteful and unintentional about product life cycles and resource use. It churns out 100 billion pieces of clothing annually and sends 60% of that to landfills within a year. This is a significant waste of resources and energy: the production of 1kg of fabric generates 23kg of greenhouse gasses, and garment manufacturing accounts for 20% of global industrial water pollution.

Rather than pumping out countless copies of poor-quality garments and hoping people will buy them, Unspun waits until the order comes in before starting production. The company makes one pair of jeans at a time, upon receiving a customer's order. The company uses a mobile app to help each customer capture a 3D body scan of themselves to craft tailor-made jeans for them. Unlike off-the-rack jeans that usually have to be altered for length, every pair of Unspun jeans fits each customer perfectly.

Unspun jeans are manufactured using a fully automated and zero-waste manufacturing process that avoids the use of harmful chemicals as well as treating and recycling 100% of the water used in the production process. The brand also prioritizes sustainability by using 100% vegan fabrics, promising that no animal products are used in their materials sourcing, treatment processes, or production.

The company aims to reduce global carbon emissions by 1% through this on-demand, localized, and automated manufacturing process. At its recently opened Hong Kong store, customers can even bring in old jeans for repurposing, bringing the manufacturing process full circle.

Unspun 的使命，是以時尚的設計、製造和消費為切入點，減低服裝行業過度消費和生產過剩的傾向。行業在越來越短的周期內，不斷推出新的款式和設計，以吸引消費者購買更多商品。

今時今日的服裝行業，在產品生命週期和資源使用方面，存在大量無意義的浪費。整個工業每年生產 1,000 億件衣服，但同時將其中 60% 送往堆填區，對資源和能源的浪費相當驚人，因為每生產一公斤紡織品，即產生 23 公斤溫室氣體，再者服裝製造佔了全球工業水污染的 20%。

對比大量生產劣質服裝繼而等待被購買，Unspun 在收到每一位顧客的訂單才開始牛仔褲的製作。通過手機應用程式為客戶建立 3D 人體掃描，用於製作度身定造的牛仔褲。現成牛仔褲通常需要修改長度，Unspun 出品的每條牛仔褲卻可完美地合身。

Unspun 牛仔褲的生產程序全自動化和零廢物排放，亦避免使用有害化學物質，並會百份百處理和回收生產過程中使用的水。品牌使用 100% 純素布料以確保可持續性，同時承諾在其物料採購、處理過程或生產中不使用動物製品。

品牌願景是通過這種按需求生產、本地化和自動化的製造流程，把全球碳排放量減少 1%。在其最近開設的香港店，顧客甚至可以帶同舊牛仔褲作再生利用，完美體現生產循環的精神。

REUSE & UPCYCLE:

LOCAL AND BEYOND

重用與升級再造：本地及國際例子

Upcycling, the remaking or repurposing of garments to create a product of higher quality or value than its original, has been one of the past decade's popular but time-consuming and costly way-outs for discarded products in the fashion industry. With the culture of fast fashion continuing to dominate, over 3.5 billion pairs of jeans are produced worldwide every year against a world population of almost 8 billion.

Overproduction results in leftover stock that is usually sent to incineration or left to decompose in landfills. To reduce the pressure on the earth, various companies have taken on different strategies in dealing with deadstock jeans and fabrics, for instance, by repurposing these materials into something new and wearable, or altering the cuttings of deadstock jeans into new fits.

升級再造，即為衣服進行翻新或再利用，以創造出比原來品質或價值更高的產品，是過去十年處理被棄置時裝產品最普遍的方法，但過程既耗時又高成本。隨着速食時裝繼續主導市場，在世界人口約80億的當下，全球每年卻生產了超過35億條牛仔褲。

生產過剩的貨品往往會被送往焚化爐或棄置於堆填區。為了減輕對環境的壓力，各家企業採取了不同策略去處理滯銷的牛仔褲及布料，例如將材料重新製作成其他衣物，或將貨尾改造成全新的款式及剪裁。

Image: Unsplash

FASHION CLINIC: TURNING INVENTORY OF CALVIN KLEIN JEANS INTO A NEW CAPSULE COLLECTION

FASHION CLINIC: CALVIN KLEIN 倉底牛仔褲轉生成全新限定系列

FASHION CLINIC

Hong Kong startup **Fashion Clinic** collaborated with Calvin Klein and launched the REIMAGINED DENIM COLLECTION, an upcycled limited edition capsule collection that was exclusively available in Hong Kong, with the whole production taking place in the city.

To kick off the project, a total of 2,000 pairs of off-season, unworn **Calvin Klein** jeans were handed to Fashion Clinic. To make the whole manufacturing process more sustainable, the team reached out to local manufacturers to transform the deadstock into a collection of denim jackets, jeans, hats, skirts, bralettes, and a special tiger teddy. Storing 2,000 pairs of jeans was one of the struggles, and taking these jeans apart was another, both in terms of technical know-how and the time involved, since these denim garments were all attached with hardware like zippers, studs, and rivets. To make the best use of those scrap fabrics that could not upcycle, Fashion Clinic collected several boxes of them to be part of the capsule collection's in-store event, with a needle-punching machine set up for people to turn these denim scraps into coasters.

Kay Wong, creative director of Fashion Clinic, has observed over the years that the city has a very high throw-away culture, making upcycling all the more critical. The production and time costs for upcycling products are much higher than producing new ones. Yet there is still much room to raise people's awareness of sustainability and develop upcycling culture and businesses compared to the rest of the world.

本地初創公司**Fashion Clinic**與**Calvin Klein**合作的升級再造限定系列REIMAGINED DENIM COLLECTION在香港獨家發售，整個生產過程亦於香港進行。

Calvin Klein總共將二千條全新的過季牛仔褲交給Fashion Clinic。為了使整個製造過程更具可持續性，團隊聯繫了本地製造商，將這些剩貨轉化為全新系列，包括牛仔褸、牛仔褲、帽子、裙子、束胸和特製的老虎玩具熊。解拆這些牛仔褲不論在技術上還是時間方面，都是難題。升級回收的牛仔布料還附有不同的部件，如拉鍊、爪釘和拉釘。為了物盡其用，好幾箱無法被升級再造的零碎布料被收集起來，在店內舉辦迷你限量系列的活動，設置了一台針刺機，供人們把這些牛仔布廢料變成杯墊。

Fashion Clinic創意總監Kay Wong經過多年觀察，發現這個城市的丟棄文化非常嚴重，因此升級回收及再造至為重要。升級再造產品的生產和時間成本遠高於由零開始製作全新產品，因此售價更高。與世界其他地區相比，香港在提升對可持續發展的意識，以及發展升級再造文化和企業等方面，都有很大的進步空間。

Image Courtesy: Fashion Clinic

Fashion Clinic

FOUNDED 成立年份	2017
HEADQUARTERS 總部	Hong Kong 香港

FASHION-CLINIC.CO

RE/DONE: ALTERING VINTAGE JEANS INTO MODERN FITS

RE/DONE: 以現代剪裁 將經典牛仔褲重生

Los Angeles-based **RE/DONE** focuses on creating sustainable, mindful fashion. The company started out by altering vintage Levi's jeans into new, modern fits, and has since evolved to create its own denim based on vintage styles. Designers from the label scour vintage stores and flea markets and hand-pick vintage men's jeans in order to rework them to fit fashionable modern women.

Denim that has been distressed through actual wear and tear is comfortable to wear, and no two pieces look the same. As a result, every item in the RE/DONE catalogue has an individual look and is a one-of-a-kind luxury piece. Since day one, the brand has made sustainability central to its operation. By extending the life of stagnant stock, RE/DONE has so far diverted 225,850 garments from landfills and saved millions of gallons of water. Industry-standard treatments like sand-washing and chemical processes result in runoff that can be massively damaging to the environment. By contrast, RE/DONE employs water-reduced, low-chemical manufacturing methods in its production without the use of any harsh chemicals.

RE/DONE has been committed to creating a sustainable fashion brand from the start. All of their products are made locally, with the production range limited to a 15-mile radius of their LA headquarters, thus stimulating the local community. The brand uses recycled packaging and a large portion of their product is upcycled as well.

Founders Sean Barron and Jamie Mazur believe that Re/Done is the quintessential brand for millennials, reflecting their concern for the environment while at the same time embodying their sense of uniqueness and individuality.

RE/DONE

總部位於洛杉磯的 **RE/DONE** 專注創作可持續和正念的時裝。品牌把經典 Levi's 牛仔褲改造成嶄新、稱身的服飾，逐漸發展出經典風格為主的牛仔服飾。設計師在古著店和跳蚤市場尋寶，親手挑選經典的男裝牛仔衣物，再重部剪裁至切合現代女性身型的版型。

經歲月磨損的牛仔褲極為舒適，而且絕不會一模一樣。因此，RE/DONE 目錄中的每件服飾都各有特色，全是獨一無二的精品。從一開始品牌已把可持續發展視為業務核心。通過延長貨品的使用期，RE/DONE 迄今已把 225,850 件衣物從垃圾堆填區拯救，並節省了數百萬加侖的水。石磨和化學處理等工序產生大量污水，對環境造成嚴重破壞，RE/DONE 在生產過程中採用節水及低度使用化學品的方法，亦不使用任何刺激性化學物質。

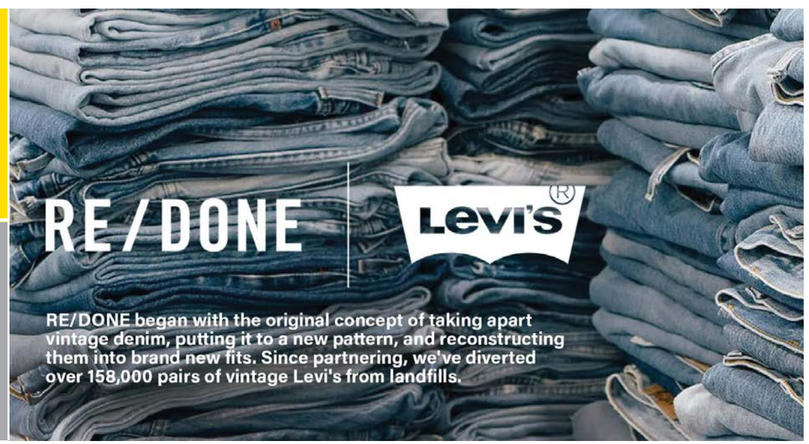
RE/DONE 致力打造一個可持續發展的時尚品牌，因此所有產品均在當地生產，生產圓周僅限於洛杉磯總部方圓 15 英里的範圍，從而刺激當地社區發展。品牌更使用回收包裝，同時把很大部分的產品升級再造。

創辦人 Sean Barron 和 Jamie Mazur 認為，RE/DONE 是千禧年代的品牌，不但反映他們對環境的關注，也體現他們的獨特個性。

RE/DONE

FOUNDED 成立年份	2014
HEADQUARTERS 總部	California, USA 美國加州

SHOPREDONE.COM



BLISS AND MISCHIEF: BRAND-NEW JEANS SOURCED FROM DEADSTOCK COTTON DENIM

BLISS AND MISCHIEF: 以滯銷棉質牛仔布 製成全新牛仔褲

Hillary Justin started her label, **Bliss and Mischief**, by updating vintage jeans with Western motifs and gigantic rose embroideries, and they were such a hit that she was able to expand into a full line of T-shirts, jumpsuits, and knits.

In 2017, she introduced a line of brand-new vintage style jeans designed, sewn and hand-detailed entirely in Los Angeles, California. The denim used is sourced from 100% deadstock cotton denim found locally , and the brand has also been steadfast in connecting personally with local sewers and manufacturers. This ensures that Bliss and Mischief's carbon footprint is kept to a minimum.

Denim is made from cotton, which is grown with harmful fertilizers and pesticides and requires huge amounts of water to produce. Growing the cotton for a single pair of non-organic cotton jeans might take upwards of 1,800 gallons of water. The global demand for cotton has also led to over-farmed, barren land, and soil erosion, which affects the health of the entire planet.

By using deadstock for a large part of its denim line, Bliss and Mischief helps cut down on the harmful effects of cotton cultivation and garment production. Deadstock fabrics are usually a result of overproduction, leftover stock, or cancelled orders from the large garment makers, factories, and textile mills around the world.

BLISS AND MISCHIEF

Hillary Justin 創立的自家品牌 **Bliss and Mischief**，通過用西部牛仔圖案和巨大的玫瑰刺繡，把經典的牛仔褲改頭換面，及後更增加 T 袖、連身褲和針織等系列。

2017 年，她推出全新牛仔褲系列，把百份百本地採購的滯銷牛仔布料活化成新的服裝，並配上精緻的手工細節。品牌的產品全部於洛杉磯設計、縫紉和手工製作，與當地縫匠和製造商建立緊密聯繫，確保 Bliss and Mischief 的碳足跡保持在最低程度。

牛仔布是由棉花製成，棉花的種植使用大量有害肥料和殺蟲劑，並需要大量的水。一條非有機棉的牛仔褲所使用的棉花，可能需要超過 1,800 加侖的水去種植。全球對棉花的需求也導致過度耕種、土地貧瘠和水土流失，對整個地球都有害。

Bliss and Mischief 製作的牛仔褲系列，大部份使用滯銷的存貨，有助減少棉花種植和服裝生產的不良影響。滯銷牛仔布通常來自廠商的生產過剩，或訂單被取消等原因。

Image Courtesy: Bliss and Mischief

BLISS AND MISCHIEF

FOUNDED 成立年份	2014
HEADQUARTERS 總部	California, USA 美國加州

BLISSANDMISCHIEF.COM

RECYCLE:

NEW GENERATION SUSTAINABLE FIBERS & INNOVATIONS

循環再造：新世代可持續纖維及創新方法

Image Courtesy: Pangaia, Evrnu

Nowadays, only 1% of textiles are effectively recycled. When garments are worn out or no longer wanted, some are sold second-hand or used as hand-me-downs, but the vast majority end up in landfills or are sent to incinerate. The recycling rate is low since certain materials, particularly polycotton garment, cannot be recycled with satisfactory quality on a large enough scale. At the same time, garments and their components are held together by a synthetic high-strength thread mostly made of polyester. Before recycling, the threads need to be removed, which is an expensive process. The lifecycle of garments would come to a stop.

In order to tackle the above difficulties in facilitating the recycling of garments, some start-ups have invented materials that could either be easily dissolved or regenerated, which could bring massive changes to the lifecycle of garments in the long term.

現時只有 1% 的紡織品能達至有效回收。當衣服變舊或被丟棄時，部分會被當作二手貨出售或轉贈他人，但絕大多數最終會被送往堆填區或被焚化。由於某些物料的衣服，例如聚酯棉，都無法被大量回收，因此回收率非常低。與此同時，衣服及其部件都由高強度人造纖維線縫紉在一起，必須先將這些線移除才能回收，但這個工序的成本很高，所以衣服的循環再造之路可說是難關重重。

有見及此，不少初創公司開發了各種創新技術，製作出可溶性或可循環再造物料，從長遠來看，有望為紡織品的再生帶來巨大改變。

EVRNU: REGENERATIVE FIBER TECHNOLOGIES THAT TRANSFORM DISCARDED OLD CLOTHING INTO NEW RAW MATERIALS

EVRNU: 再生纖維技術可以將廢棄的舊衣服轉化新的原材料

EVRNU

FOUNDED 成立年份	2014
HEADQUARTERS 總部	Seattle, WA, USA 美國西雅圖

The Mills Fabrica's portfolio company

EVRNU.COM

EVRNU

Image Courtesy: Pangaia, Evrnu

Evrnu is the inventor and intellectual property owner of a wide range of regenerative fiber technologies. Named NuCycl, this process enables entirely new products to be made from discarded clothing, not just once but multiple times. The company has also invented fiber technologies that enable old clothing to be transformed into new, high-quality raw materials.

These technologies are a solution to the greatest threats currently facing the industry: textile waste, resource consumption, and environmental damage. Evrnu's manufacturing processes use 98% less water than what is required for virgin cotton production, eliminating 80% of typical pollutant emissions, and can be regenerated multiple times. The company offers an environment-sparing alternative for the world's highest demand fibers -- cotton, polyester, and rayon -- and is currently being adopted by the world's largest brands and retailers.

NuCycl technology uses repolymerization turning even the toughest type of textile waste into new materials. This process creates pristine new regenerative lyocell fibers from textile waste, providing both performance and environmental advantages compared to virgin fiber. One of the company's products is a high-performance, fully recyclable material made entirely from cotton waste. In what the company calls a "huge breakthrough" for the industry, Evrnu sources discarded cotton to create more sustainable fibers that can replace conventional textile materials.

In addition to its strength and comfort properties, NuCycl materials can also be recycled up to ten times, enabling the textile industry to transform waste into a valuable resource. Evrnu is facilitating this development by constructing a new facility in the southeast United States that will process about 17,000 metric tons of pulp and 2,000 tons of fiber every year.

Evrnu 是多種再生纖維技術的研發者和知識產權擁有者，推出名為 NuCycl 的程序，把棄置的衣服製作成為全新產品，而且能不斷再造。Evrnu 發明的纖維技術，將舊衣服轉化為新的優質原材料。

技術為製衣業當前面臨的問題如紡織廢料、資源消耗和環境破壞等提供解決方案。Evrnu 製造過程的用水量比原棉生產所需少 98%，同時消除 80% 的一般污染物排放，並可多次循環再造。公司為需求量極大的棉花、人造纖維和人造絲提供環保替代品，這些產品目前已被世界頂級的品牌和零售商採用。

NuCycl 使用的再聚合技術，把原始纖維分子轉化為新型高性能可再生纖維，即使是最堅靱的紡織廢料，也能轉化為新材料。技術從紡織廢料中創造出原始的新型再生萊賽爾溶解性纖維，與原生纖維相比，品質更好也更環保。公司的產品包括一種完全由棉布廢料製成的高性能又可完全回收的物料，Evrnu 視之為行業的重大突破。透過採購廢棄的棉花，製造出可替代一般紡織材料的高質纖維。

除了具強度和舒適性之外，NuCycl 布料可回收達十次，將廢物轉化成為有價值的資源。Evrnu 計劃在美國東南部建造一所新工廠，設施每年能處理約 17,000 公噸紙漿和 2,000 噸纖維。

RENEWCELL: DISSOLVING USED COTTON TO PRODUCE BIODEGRADABLE MATERIALS

RENEWCELL: 由可溶解棉花而來的生物可分解素材

RENEWCELL

FOUNDED 成立年份 2012

HEADQUARTERS 總部 Sweden 瑞典

The Mills Fabrica's portfolio company

RENEWCELL.COM

RENEWCELL

Image Courtesy: Renewcell

Renewcell, a Swedish company, aims to find a way out of this problem by offering a recycling technology that dissolves used cotton and other cellulose fibers and transforms them into a new, biodegradable raw material called Circulose pulp. It then sells the product to manufacturers, who use it to make biodegradable virgin quality viscose or Lyocell textile fibers.

Circulose is a branded "dissolving pulp" product that Renewcell makes from 100% textile waste such as worn-out jeans and production scraps. There are other "dissolving pulp" products on the market, but the difference with Circulose is that it is made from textile waste instead of wood, thus reducing the need to cut down trees. Fibres produced with Circulose can help brands limit the use of virgin textiles and reduce the climate and environmental impact caused by raw material production and waste. Renewcell 1, the first industrial-scale, textile-to-textile recycling facility in the world, opened in August 2022 in northern Sweden, which recycles worn-out jeans and production scraps to manufacture up to 60,000 metric tonnes of Circulose pulp every year.

The company has already signed deals with major fashion brands like Zara and H&M to supply them with Circulose. Such collaborations could potentially save hundreds of millions of garments from landfills and incineration each year, contributing to a reduction in greenhouse gas emissions from the textile industry.

瑞典公司 **Renewcell** 致力提供技術方案以解決這些問題，研發出可溶解使用過的棉花和其他纖維的技術，再轉化為一種名為 Circulose 棉漿的新型可生物分解原材料，然後再把產品出售予製衣商，製造可生物分解的原生人造絲纖維或萊賽爾紡織纖維。

Circulose 是一種「溶解漿」品牌產品，由 Renewcell 從 100% 紡織廢料（如舊牛仔褲和廢棄布料）製成。現時市場上也有其他「溶解漿」產品，但 Circulose 的原料不是木材而是紡織廢料，因而減低了砍伐樹木的需要。使用 Circulose 生產的纖維，可幫助服裝品牌減少使用原生紡織品，亦減低原材料生產和浪費對氣候和環境造成的影響。Renewcell 1 是全球首座工業規模的紡織品回收工廠，已於 2022 年八月在瑞典北部正式投入服務，紡織廢料如破舊牛仔褲及廢棄布料，會經回收並生產出 6 萬公噸 Circulose 溶解漿。

該公司已經和 Zara 和 H&M 等大型時尚品牌簽約供應 Circulose，每年可避免數以億計的衣物被堆填和焚化，有助減低整個紡織業的碳排放。

RESORTECS: HEAT-DISSOLVABLE STITCHING THREAD THAT FACILITATES GARMENT DISMANTLING PROCESS

RESORTECS: 可熱溶縫線加速紡織品回收過程

FOUNDED 成立年份 2017

HEADQUARTERS 總部 Brussles, Belgium 比利時布魯塞爾

RESORTECS.COM

RESORTECS

Image Courtesy: Resortecs

Resortecs is committed to achieving full circularity in the textile and fashion industries. Today, only 1% of textiles are effectively recycled. This is because in the modern production process, garments and their components are held together by a synthetic high-strength thread mostly made of polyester. Before recycling, the garment needs to be separated and the thread removed, proving expensive. Without this process, the quality of the recycled product will be compromised.

Resortecs' mission is to make recycling easy and actionable for fashion brands, recyclers, and all supply chain partners through innovative design-for-disassembly technology, which enables high-quality textile recycling on an industrial scale.

The company has come up with a heat-dissolvable stitching thread that enables recycling of end-of-life items easy, beginning from the product's manufacturing stage. Resortec has also invented a thermal disassembly system that allows recyclers to tap into higher volumes of premium material and process millions of garments per year without losing quality. When combined, these innovations make it possible to recover up to 90% of clothing fabric and empower the garment industry to rise to today's environmental challenges.

By using Resortecs' patented technology, the percentage of textile lost in the recycling process is reduced to 10%, while the integrity of the textile is not damaged, meaning that new garments can use a higher percentage of recycled material. Furthermore, the company's process makes the garment dismantling process much easier and five times faster. This improves the effectiveness and economic viability of recycling, particularly in countries where labour costs are high.

Resortecs 致力實現紡織和時尚行業的全面循環。現時只有 1% 的紡織品得到有效回收。 這是因為在現代生產過程中，服裝及其部件大都以高強度人造纖維線縫紉。在回收之前，必須將衣服分開並除去這些人造纖維縫線，否則回收產品的質素會受影響。另一個關鍵因素是，拆除這些縫線成本很高，在過程中也會造成浪費。

Resortecs 的使命是通過創新的拆除技術，讓回收變得容易和可行，在時裝品牌、回收商和整個供應鏈中應用，實現工業規模的高質素紡織品回收。公司推出了可熱溶的縫合線，使回收商能更大量地獲得優質材料，並可每年處理數百萬件服裝也不會減低質素。這些創新科技結合起來，便能夠回收高達 90% 的服裝布料，讓服裝行業能夠應對當今的環境挑戰。

通過使用 Resortecs 的專利技術，回收時只有大約 10% 的紡織布料損失，而織物的完整性沒有受到破壞，這意味着新造的衣物可以使用更高比例的回收物料。此外，該公司的流程使服裝拆除過程變得更加容易，速度提高五倍。這亦提升回收的有效性和經濟可行性，尤其是在勞動力成本高的國家更加有利。

THE MILLS FABRICA × ADVANCE DENIM × THE MAGIC OF DENIM CONSULTANCY PRESENT:

SUSTAINABLE DENIM EDUCATION IN ASIA PACIFIC INITIATIVE

南豐作坊 × 前進牛仔 × THE MAGIC OF DENIM CONSULTANCY 提案：「亞太地區可持續牛仔服教育倡議」

The Mills Fabrica is in partnership with The Magic of Denim Consultancy and Advance Denim to present the "Sustainable Denim Education in Asia Pacific" initiative, a member of the United Nations Conscious Fashion and Lifestyle Network.

Aiming to promote, teach and advocate denim sustainability and circularity within the APAC region, a wide range of masterclasses, collaborative lectures, workshops, conferences and seminars will be organized for schools, universities, NGOs and design organizations. Through the partnership with denim industry experts from the APAC supply chain, brands, and schools, denim sustainability programs will be tailored and designed to accommodate the specific needs of the audience including vocational training programs and different denim companies.

The Mills Fabrica presented the Denim Futures Conference & Showcase in September 2022 as the first public event of the initiative.

作為「聯合國意識時尚與生活方式網絡」網上平台的一部分，南豐作坊、The Magic of Denim Consultancy 和前進牛仔正攜手提出「亞太地區可持續牛仔服教育」倡議。

各式各樣的大師班、合作講座、工作坊、會議和研討會將於多間院校、大學、非政府組織和設計組織中展開，以求在亞太地區推廣、教授和倡導牛仔服的可持續性和循環性。此外，倡議亦期望促成區內供應鏈、品牌及學校的牛仔業專家之間的合作，針對設計及構思牛仔服推出可持續發展計劃，從而滿足各類職業訓練課程及牛仔產品公司的獨特需求。

而南豐作坊早於 2022 年 9 月已舉辦牛仔服未來會議和展示會，作為該倡議的首次公開活動。

AN INTERVIEW WITH DAVID TRING: ON SUSTAINABILITY AND THE FUTURE OF SUSTAINABLE DENIM EDUCATION IN HONG KONG AND ASIA

DAVID TRING 專訪：關於香港和亞洲可持續牛仔服教育的持續發展性與未來

David Tring, currently the Denim Head of The Magic of Denim Consultancy, has nearly 40 years in the fashion industry and made his first plea for sustainability in 1989. David released his first sustainability collection in 1992. We talked to David Tring on the idea of sustainability, the education of sustainable denim in Hong Kong and the APAC market in particular, and his latest initiative "The Sustainable Denim Education in Asia".

身為 The Magic of Denim Consultancy 的牛仔服主理人，David Tring 於時裝界經歷接近 40 年個寒暑，早於 1989 年已首次向業界呼籲可持續發展的遠景，更於 1992 年推出他首個可持續發展系列。今次，我們與 David 就可持續發展作深入交談，以了解香港和亞太地區可持續牛仔服的教育前景，以及他最新倡議「亞洲可持續牛仔服教育」的理念。

Image Courtesy: The Magic of Denim Consultancy

DEFINING SUSTAINABILITY

The term "sustainability development" was first popularised in the Our Common Future report published by the United Nations in 1987, which was also known as the Brundtland Commission. The term "sustainable development" has since been defined as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." However, David Tring has observed that "the word has been misused in the greenwashing campaigns of big companies across all industries and products that are important (for us) to step back and understand what the term really means."

To Tring, if a company reduces its greenhouse gas emissions or water usage but if it cannot meet the criteria set by the United Nations, then it should not be regarded as sustainable. "We need them to go all the way and we need to encourage them to do that. The future generations that include those currently in school, will never forgive us if we have it in our power to act differently and we don't."

定義可持續性

「可持續發展（sustainability development）」一詞的普及，最早可追溯至聯合國於 1987 年發布的《我們的共同未來》報告（又稱為布倫特蘭委員會報告），自那時起，「可持續發展」就被定義為「既滿足當代人需要，又不損害後世對滿足其需要的能力的發展項目」。然而，David Tring 卻察覺到「在現代社會，這個詞彙開始被不同行業或商品的大型企業濫用，當成為公司『綠漂』的活動，因此如今更重要的，是退後一步去瞭解這詞彙的真正含義。」

對 David 來說，一間公司即使有減少溫室氣體排放或用水量，但若未能達到聯合國所設定的標準，則仍不應被視為「可持續」。「我們需要他們完全達至目標，必需鼓勵他們做到。若我們明明具備能力，卻沒有採取任何行動，我們的後代，包括正在讀書的孩子們，將永遠不原諒我們。」

THE HONG KONG SCENE AND ITS FUTURE

Lagging behind Europe in sustainable development and the understanding of sustainability, Hong Kong has a long way to go in reducing carbon emissions, Tring says. “there are good initiatives to teach sustainability in universities and organizations like The Mills Fabrica, and environmental NGOs like Redress who are doing impactful work especially around teaching circular economy and raising the issues regarding landfill.”

He finds the denim industry in Hong Kong has a very close-knit community that is eager to support the next generations and has been giving lectures to year 2 students from the Hong Kong Design Institute (HKDI) on sustainable denim design. “HKDI is a vocational institute that is open to partnering with the industry. Some of the world’s biggest denim companies which focus on sustainable denim innovation such as Advance Denim, Lenzing Fibre, Jeanologia, Cone Denim and the Crystal Group are actively supporting us with this project.”

Currently, 200 garments enter landfills every 10 seconds in Hong Kong. Resources that could be repurposed back into the supply chain to make new projects are wasted. David Tring pointed out that 80% of the decisions that affect the sustainability of any items of clothing are baked in at the design stage. He sees education as a way of bringing changes. “Educating students majoring in design, marketing, and buying that design is about a set of choices and the ways of making garments can be more sustainable through different means of design is at the top of my priority list this year.”

THE “SUSTAINABLE DENIM EDUCATION IN ASIA PACIFIC” INITIATIVE

In the Greater Bay Area, currently over 250,000 people are employed in the denim industry, but there lacks an education program that specifically supports the industry. David Tring believes Hong Kong will become the education hub in the teaching of sustainable denim for the Asian Pacific area and this belief resulted in the birth of the Sustainable Denim Education in Asia Pacific initiative. The Magic of Denim Consultancy is proud to be a member of the United Nations Conscious Fashion and Lifestyle Network for industry stakeholders, media, Governments, and UN system entities to showcase initiatives and collaborations that accelerate the implementation of the Sustainable Development Goals.

“Our aim is to promote, teach and advocate denim sustainability and circularity within the APAC region, by partnering with schools, universities, NGOs, design organisations and denim companies.” Through bringing real industry expertise together with Asia’s best education partners, Tring is determined to bring real changes to the region.

“I truly believe that education is the gift that one generation gives to another, but it is also true that it does not flow in just from one direction. The students today are often called “Gen Z”, who really have “purpose” as their value. If we nurture that with the correct approach, they can go on to educate others once they reach full employment. Sustainability is made of two words, “sustain” and “ability”. Raising their “ability” to understand and find solutions to climate crisis is critical for their future careers and the world they will inherit from us.”

“OUR AIM IS TO PROMOTE, TEACH AND ADVOCATE DENIM SUSTAINABILITY AND CIRCULARITY WITHIN THE APAC REGION.”

「我們的目標是與院校、大學、非政府組織、設計組織和牛仔服公司合作，從而在亞太區推動、教育及倡導牛仔布的可持續性和循環性。」

香港業界景象及未來

David 表示，香港在理解和實踐可持續發展比歐洲地區落後得多，在減少碳排放方面亦仍有很長遠的路要走。「部分大學及機構例如南豐作坊，或 Redress 一類非政府環保組織都提出很好的倡議來教育可持續性，他們切切實實地做著具影響力的工作，特別是循環經濟方面的教育，以及提出關於垃圾堆填區的問題。」

一直為香港知專設計學院（HKDI）二年級學生講授牛仔布設計可持續性的 David，更發現香港的牛仔業社群擁有緊密的聯繫，並渴望支持下一代。「HKDI 是一所很願意與業界合作的職業學院，而前進牛仔、蘭精集團、Jeanologia、Cone Denim 和晶苑集團等多間專注於可持續牛仔布創新的龍頭企業，則不遺餘力地積極支持我們這項目。」

目前，香港每 10 秒就有 200 件成衣被丟進垃圾堆填區，這些本可以重新投入供應鏈、並應用於新項目的資源就這樣被白白浪費。對此，David 指出能影響服飾可持續性的決策中，其實有 80% 需要在設計階段確立，因此，他深信教育才能帶來變化。「為設計、市場營銷和採購系的學生進行培訓教育，當中最重要的是向他們展現選擇，教導他們利用不同的設計方式，將服飾變得更具可持續性，這是我今年最首要的任務。」

「亞太區可持續牛仔服教育」倡議

目前在大灣區，牛仔行業就有超過 25 萬人力，卻缺乏專門的教育計劃作支援。David 認為，香港有能力成為亞太地區可持續牛仔服培訓的教育樞紐，並推動「亞太區可持續牛仔教育」倡議的誕生。The Magic of Denim Consultancy 有幸成為「聯合國意識時尚與生活方式網絡（United Nations Conscious Fashion and Lifestyle Network）」的一員，一個為業內人士、傳媒、政府和聯合國系統單位，展示加速實施可持續發展目標的倡議和合作項目。

「我們的目標是與院校、大學、非政府組織、設計機構和牛仔服公司合作，從而在亞太區推動、教育及倡導牛仔布的可持續性和循環性。」David 期望透過連結真正的專業知識及亞洲最好的教育夥伴，為這地區帶來真正的變化。

「我堅信教育是一代贈予下一代的禮物，但同時亦明白教育絕非只有單向流動。當今的學生普遍被稱為『Z 世代』，價值觀較『目標為本』。若我們能以正確的方法培養，到他們達至充分就業時，就可以將理念授予更多人。可持續性（sustainability）其實由『持續（sustain）』和『能力（ability）』兩個單詞組成，而提高他們理解和尋找氣候危機解決方案的『能力』，對他們的未來、乃至從我們手上承繼而來的世界至關重要。」

THE MILLS FABRICA × CENTRAL SAINT MARTINS INNOVATION AWARD 2022

南豐作坊暨中央聖馬丁學院創新獎 2022

The Mills Fabrica partners with Central Saint Martins UAL, the internationally renowned center for arts and design education, to award The Mills Fabrica Innovation Prize to one graduate student in honor of the creativity and vision shown in developing outstanding material innovations.

南豐作坊與全球知名的中央聖馬丁藝術與設計學院攜手頒發南豐作坊創新獎，予在材料創新項目中展現出色創造力和遠見的碩士生。

Image Courtesy: Malu Luecking

The award for 2022 goes to Malu Luecking, MA Biodesign, with her project “Landless Food”, which uses microalgae to regenerate extinct flavors. The project is set in 2050, when people’s culinary lives have been reduced by the impacts of climate change and loss of biodiversity. Malu looks at the social and intimate experience of food, and by introducing a new family of flavors based on microalgae, brings culinary memories back to the dining table. The project presents six food objects as reincarnations of three types of lost flavors.

Malu is awarded a cash prize of £1,000 and a three-month residency at the space of The Mills Fabrica either in Hong Kong or London. To her, there is not better partner for her project because both cities are “where algae is already so deeply integrated into the food culture”. She is looking forward to hosting microalgae dinner experiences with the local community in Hong Kong.

2022 年度的獎項由生物設計碩士生 Malu Luecking 獲得。她的項目「Landless Food」以微藻為基礎，製成大家回憶中味蕾的感覺，項目以 2050 年為背景，當人類的飲食被氣候變化及喪失生物多樣性等原因而大大壓縮，Malu 從飲食的社交功能及親密體驗當中，以微藻把回憶中的味道重新帶到食桌。「Landless Food」帶來六種口味，包括三款已經消失的味道。

Malu 獲得 1000 英鎊現金獎，以及為期三個月於香港或倫敦南豐作坊的駐場計劃。她認為這兩個城市的飲食文化中藻類是不可或缺的食材，期待日後於為本土香港人開辦微藻晚宴體驗。

TECHSTYLE FOR SOCIAL GOOD INTERNATIONAL STUDENT COMPETITION 2022

TECHSTYLE FOR SOCIAL GOOD
國際學生比賽 2022

The Mills Fabrica has been hosting the annual "Techstyle For Social Good" International Student Competition since 2019 to drive social impact and sustainable development through awarding techstyle and agrifood prizes to game-changing technology ideas from young innovators. Among 250 submissions received, five teams from Hong Kong, Singapore, the UK and Nigeria, which showcased great potential in steering innovation and positive impact, were shortlisted as this year's winning teams.

南豐作坊自 2019 年起每年都會舉辦「Techstyle For Social Good」國際學生比賽，挑選值得獎勵的服裝紡織和農業食品創新方案，以推動可持續發展及締造社會影響力。五組分別來自香港、新加坡、英國及尼日利亞的團隊，從 250 份的方案之中脫穎而出成為本年度的得獎者，展現了推動創新及正向影響的極大潛力。

> **To create a positive social and environmental impact for future generations, The Mills Fabrica will continue to endeavor in the acceleration of the growth of sustainable innovations.**
>
> **南豐作坊將繼續以推進可持續創新為己任，為未來開拓更多正向的社會發展。**

Cintia Nunes
General Manager and Head of Asia, The Mills Fabrica
南豐作坊亞洲總經理

The winning teams are given extensive support to further develop their projects, including residencies at The Mills Fabrica in Hong Kong or London, mentorship, access to flexible coworking space, Fabrica Lab, as well as exposure to the media, The Mills Fabrica's industry partners and community through events and showcases.

各得獎團隊會獲得全面支持去拓展他們的方案，包括於香港或倫敦南豐作坊的駐場計劃、接受營商指導、使用共同工作空間及南豐作坊 Lab、媒體曝光機會、出席南豐作坊夥伴和社群舉辦的業界活動。

GRAND PRIZE WINNERS
大獎得主

AGRIFOOD
農業及食品科技

THE MOONBEAM CO.

National University of Singapore & Nanyang Technological University
新加坡國立大學 及 南洋理工大學

The team transforms unserved rice and brewers' spent grains into granola products, contributing to food security through more efficient use of resources, hence reducing food waste.

"We are looking to scale our processes while finding ways to spread awareness of food waste and food waste upcycling."

團隊將未被食用的米及啤酒糟轉化成穀物製品，透過更有效地分配資源保障食品供應，同時減少食物浪費。

「我們希望在擴展製作規模的同時，可以提高大眾對食物浪費及剩食升級再造的關注。」

THEMOONBEAM.CO

APPAREL / TEXTILES
服裝紡織

FIBE

Imperial College London
倫敦帝國學院

They extract fibers from potato harvest waste to create fibers. Their solution consumes 90% less land and 96% less water than cotton, and 94% CO_2e savings compared to polyester.

"In the short term, we will continue the research and development to reduce the cost of the sustainable process with the intention of making the material price competitive with cotton."

團隊從馬鈴薯的農作物廢料中提煉纖維。這個方案比棉花少用 90% 的土地以及 96% 的水資源，並比製造聚酯纖維少 94% 的二氧化碳當量（CO_2e）。

「在短期內，我們會繼續研究開發的工作，致力減低可持續程序的開支，希望在原材料的價格上可與棉花匹敵。」

FIBE.UK

SPECIAL PRIZE WINNERS
特別獎得主

AGRIFOOD
農業及食品科技

FRUITSCOATEX

The Hong Kong Polytechnic University
香港理工大學

The innovation is a biobased coating that could extend the shelf life of fruits, reduce food loss and infection risk during delivery. From recycled naturally bio-safe materials, biopolymers are transformed into functional nanomaterials, creating a protective layer that prevents germ growth on the surface of fruits.

團隊研發的生物基的塗層可延長水果的保質期，減少食物浪費及在運送期間出現的細菌感染。這種生物聚合物由天然及對生物無害的物質重用再造，轉化成實用的納米物料，在水果表面形成保護膜，防止細菌滋生。

INNOCOATEX.COM

APPAREL / TEXTILES
服裝紡織

REDIVIVUM TECHNOLOGY

Istituto Marangoni London
倫敦馬蘭戈尼學院

Their HaaS (Hardware as a Service) solution collects and sorts textile waste with a fully traceable infrastructure, enabling fashion industry players to monitor the lifecycle of their textile waste transparently.

這個 HaaS（硬件即服務）提供具追蹤功能的設備，收集紡織廢料並進行分類，讓時裝業界可以更透明地監察紡織廢料的生命週期。

REDIVIVUMTECHNOLOGY.COM

COMMUNITY PRIZE WINNER
社群大獎

AGRIFOOD
農業及食品科技

SMARTEL FARMTECH

University of Jos, Jos Plateau State
喬斯大學

Founded in Nigeria, Smartel Farmtech develops a smart hydroponic farming system that empowers smallholder farmers and unemployed youth by lowering the entry barrier of commercial agriculture with intensive urban farming and mentorship programs.

Smartel Farmtech 是尼日利亞一所智能水耕種植系統，以遠低於一般商業農業的入場門檻，為農民及待業青年提供都市耕種設備及師友計劃。

FACEBOOK: @GROYOVEGY

FABRICA X CELEBRATES INNOVATION IN BIOMATERIALS IN TEXTILE AND LIFESTYLE PRODUCTS THROUGH A TACTILE EXPERIENCE

FABRICA X 觸感創新觸感之旅
展示「新生物料」於製衣及生活用品的應用

Starting from January 2023 and over the course of nine months, Fabrica X, the Impact Retail concept store operated by The Mills Fabrica in Hong Kong, celebrates and puts a spotlight on innovation in biomaterials in textiles and lifestyle products. Biomaterials are regenerated from organic waste through nature-based, biological processes to create more sustainable products. This showcase is in partnership with Fidelity International, Biofabricate, and Lenzing Group.

The showcase features innovations by a number of local, regional, and global innovators for the public to feel and experience. Not only can visitors shop from featured brands which produce clothing and other goods made from biomaterials, but a regular series of experiential workshops with various themes have also been organized to encourage public engagement.

由 2023 年一月開始，南豐作坊的可持續生活方式零售體驗店 Fabrica X 推出為期九個月的最新項目，展示將「新生物料」應用於製衣及生活用品的成果。「新生物料」通過天然的生物處理過程，或從有機廢物中再生，用於創造更具可持續性的產品。項目與富達國際、Biofabricate 及蘭精集團合作。

項目與來自本地及全球的合作夥伴聯繫，讓大眾可以親身體驗及感受。除了銷售採用可持續物料製成的衣飾及產品，大眾亦可參與一系列不同主題的體驗工作坊，提升公眾對新生物料的認識。

Fabrica X is the go-to impact retail store where visitors can experience sustainable living with the latest eco-friendly fashion (techstyle) and food tech (agrifood tech) brands and innovations. Our next campaign will focus on denim to uncover its material, technologies and trends.

Stay tuned and follow our Instagram!

Fabrica X 是一間推廣可持續生活方式的零售體驗店，商店內展示了與紡織科技及農業食品科技相關的創新產品及品牌。下一個主題項目是牛仔褲，由物料、技術到最新流行，都會一一探討。

請留意我們 Instagram 的最新消息！

PARTICIPATING RETAILERS (HONG KONG BRANDS)
參與品牌（香港品牌）

Everyday essentials made of Global Organic Textile Standard certified organic cotton
獲全球有機紡織品標準（GOTS）認證的有機棉質服裝

Handcrafted jewelry transformed from sustainable plants, fishtail palms and bamboo
把可再生植物如魚尾棕櫚和竹子等轉化為手工珠寶

Comfortable and luxuriously soft kids underwear crafted from TENCEL™ Modal
由天絲™ 莫代爾纖維製造的舒適柔順童裝

Comfortably sockless shoes made by natural materials derived from tree fibres and algae-based
採用樹木纖維、藻質橡膠等天然物料的透氣舒適鞋子

Premium apparel that use traceable, GMO-free linen fibres
由非基因改造亞麻製麻布升級再造的優質衣飾

Jewelry using household food waste crafted by young single mothers
由年輕單親媽媽利用廚餘親手做出的珠寶

MATERIAL SHOWCASE PARTNERS
物料創新者

Coffee Waste Leather Alternative
咖啡廢料皮革替代品

Bell Society from Indonesia converts organic waste from their local coffee industry, including coffee bean skin waste from farmers and coffee ground waste from cafes, into biodegradable materials. With the help of bacteria, coffee bean skin waste can be converted into leather alternatives, and together with coffee grounds, the husk of the coffee bean skin can be combined to create a corkboard-like material.

Bell Society 把有機廢料，包括印尼咖啡工業廢料、從潘加倫甘與芒拉央山區農夫收集的咖啡豆皮廢料，以及從咖啡廳收集的咖啡渣廢料，轉化成為可以生物降解的物料。細菌會把咖啡豆皮廢料轉化成為皮革替代品，例如 M-Tex，亦會轉化咖啡豆外殼與咖啡渣廢料，從而製造質地有如水松板的物料。M-Tex 採用天然蘇木色素染上紅色，並可於兩至四星期內在泥土中被生物降解。

Abacá Banana Plant Fabric
由馬尼拉麻蕉製造的植物布料

Qwstion's BANANATEX® is the world's first durable, technical fabric made purely from the naturally grown Abacá banana plants, requiring no pesticides, fertilizer, or extra water. The material is cultivated in the Philippine highlands within a natural ecosystem of sustainable forestry. Qwstion has collaborated with a Taiwan-based yarn specialist and weaving company to develop a 100% natural, circular, and plastic-free fabric.

Qwstion's BANANATEX® 是世上第一款耐用科技布料，純由天然種植的馬尼拉麻蕉製造。這種麻蕉種植於菲律賓高原，屬林業可持續發展的自然生態區域，種植過程中不需要使用任何殺蟲劑、肥料或額外的水分。QWSTION 與一間專精於紗線的台灣紡織公司合作，共同研發出一種 100% 天然並且可以循環再造的零塑膠布料。

Parasitic Fungus Leather Alternative
可生物降解的皮革替代品

Life Materials feature different types of 100% non-petroleum-based materials that are ethically sustainable, such as MuSkin, a vegan leather alternative made of mushrooms, and hemp paper made from 100% hemp fiber and 100% recycled cotton cellulose.

Life Materials 提供各種 100% 不含石油成份的可持續物料，包括以菌類為原材料的 MuSkin 純素皮革替代品，以及混合 100% 漢麻纖維及 100% 再生棉纖維素的漢麻紙。

Regenerative Plant-based Goose-down Alternative
由可再生植物製造的羽絨替代品

Saltyco® makes next-generation textiles from plants. The innovative method can heal damaged wetlands, transforming degenerative supply chains into regenerative ones. BioPuff, their first product, is a plant-based alternative to goose-down for outerwear insulation.

Saltyco® 利用有能力修復受損濕地的植物，為時裝業生產新世代紡織品，為供應鏈作出改變，將破壞變成再生。他們推出的首項產品 BioPuff 是一種草本羽絨替代品，一樣可以發揮戶外衣着的保暖功用。

南豐作坊 the mills fabrica

the 5th mills 南豐紗廠

ABOUT THE MILLS FABRICA

The Mills Fabrica is a go-to solutions platform accelerating techstyle and agrifood tech innovations for sustainability. Officially launched in Hong Kong in December 2018, The Mills is a landmark revitalization project by the Nan Fung Group, transforming their old textile factories into a new heritage, experiential retail, and innovation centre.

With its investment fund, business incubator, spaces in Hong Kong and London, and community-building initiatives, The Mills Fabrica aims to create success stories of collaborations between innovators, entrepreneurs, and corporates, that together, will drive positive change for future generations.

關於南豐作坊

南豐作坊是一個創新平台，致力支援紡織科技（Techstyle）和農業食品科技（Agrifood Tech）公司，借助創新和合作項目轉型至更具可持續性的未來。香港南豐紗廠在 2018 年正式開幕，是南豐集團的地標式活化項目，將一家舊紡織工廠改建成為全新的歷史建築、體驗式零售商場和創新中心。

南豐作坊透過香港和倫敦兩地的投資基金、商業培育基地和創新空間，南豐作坊致力成就創新者、創業家、各機構和企業之間的合作和成功故事，為下一代推動正向變革。

Unspun's first permanent physical store in Hong Kong
Unspun 首間香港實體店

Image Courtesy: Unspun

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