

FALL 2020

FABRICA. WEAVE

THE TECH LIFESTYLE ISSUE



IDENTIFYING
SIMILARITIES BETWEEN
FOOD AND FASHION

生活為一體：
食品與時裝的互通之處

REPURPOSING FOOD IN
FASHION AND TEXTILES

時裝紡織原料
食物全新應用

AGFUNDER: TRANSFORMING
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AGFUNDER:
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VEGAN MARKET

ABILLIONVEG:
為素食市場建立內容群體

CENTRAL SAINT MARTINS ×
THE MILLS FABRICA:

SUPPORTING EMERGING
INNOVATORS FOR THE
TECHSTYLE INDUSTRY

中央聖馬丁藝術與設計學院 ×
南豐作坊表揚 TECHSTYLE
年輕創新者

the
mills  fabrica
南豐作坊

Welcome to our newsletter! In each edition we bring 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。

FALL 2020

THE TECH LIFESTYLE ISSUE

科技時尚生活號

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Cover image / 封面圖片
TÔMTEX

EDITOR'S NOTE

TRANSITIONING TO TECHNOLOGY AND LIFESTYLE: APPAREL/TEXTILES AND FOOD/AGRITECH

The Mills Fabrica has been focusing on supporting apparel/textile innovations over the past four years. And recently, Fabrica announced its expansion into a new vertical — Agri-food tech. If we take a holistic view of the lifestyle sector, it's easy to see the interplay between the apparel and food tech industries. As Fabrica explores the innovations around the world that can impact at scale, there is an overlap between apparel/textiles and food and agritech which leads to our natural expansion and a wealth of lessons and inspiration. The cover story will show you some innovations that empower both industries to step up their game on building a sustainable supply chain.

We will also introduce some waste management solutions that enable the agri-food supply chain to reduce food waste and crop residue by reusing them for producing garments and product packaging. Vice versa, the fashion industry has also started to adopt regenerative farming methods to produce fiber, avoiding fierce competition for land between fiber and food. Our partner AgFunder, a US-based venture capital platform, will also shed light on the recent development of agri-food tech, giving you a better understanding of this thriving sector that relates to our everyday lives.

As the demand for sustainable lifestyle — from fashion and cosmetics to food and beverage — is surging, we need an online community to facilitate sustainable brands and retailers to engage their customers. We invited Vikas Garg, the CEO of abillionveg, to talk us through how the app-based review platform creates a content-based community for plant-based businesses to grow.

Apart from promising startups and innovators, we also believe good innovations emerge in schools. Therefore, Fabrica co-organized the second edition of the Techstyle for Social Good International Online Competition with The Hong Kong Polytechnic University (PolyU) to celebrate groundbreaking solutions developed by university students and graduates around the world. We also awarded two alumni from Central Saint Martins for their creative ideas by presenting them with The Mills Fabrica Techstyle and Sustainability Prizes. This is the first year where we have welcomed food-related projects for both competitions.

The recent pandemic forces us to live in the “new normal” — perhaps creating the perfect opportunity for us to reimagine the food and apparel/textiles industries, bringing about a more sustainable lifestyle for our future generations.

編者的話

擺渡到彼岸 —— 科技與生活時尚交錯：服裝及紡織、糧食及農業科技

過去四年，南豐作坊主力推動服裝／紡織創新。最近，南豐作坊宣布發展全新領域：農業糧食科技。如果我們全面地看待整個生活時尚範疇，其實服裝／紡織和農業科技之間具有合作空間。南豐作坊一致探索能有效改變世界的創新，發現到服裝／紡織和農業糧食科技具備共通之處。這帶領著我們的擴張，也為我們帶來豐富的經驗與啟發。而在這一期的封面故事，將為您介紹同時支持這兩個行業發展可持續供應鏈的創新科技。

我們也為您介紹一系列廢物處理的方案，幫助農業糧食供應鏈利用食物廢物和殘餘農作物生產服裝和貨品包裝，從而減少行業的廢棄問題。同時，時裝行業也開始借助再生農業技術生產纖維，避免出現纖維和糧食爭奪耕種土地的局面。我們的夥伴 AgFunder 是一家來自美國的創投平台，他們會講解現今農業糧食科技的發展，讓讀者多加了解這個與我們日常生活息息相關的範疇。

不論是時裝、化妝品、食物和飲料等產品，大眾對可持續生活方式的需求日漸提升，我們需要一個網上社群幫助可持續品牌和零售商緊扣他們的客戶。我們邀請了 abillionveg 的行政總裁 Vikas Garg 分享他們如何借助手機應用程式建立評論平台，從而營造一個有助植物性產品發展的內容群體。

除了出色的初企和創新者，我們相信不少優秀的創新源於學校。因此，我們繼去年後再次與香港理工大學合辦 Techstyle for Social Good 國際網上比賽，表揚全球畢業生的突破性構想。我們也向兩位倫敦中央聖馬丁藝術與設計學院的畢業生頒發「南豐作坊 Techstyle 大獎」和「南豐作坊可持續大獎」，支持他們繼續發展其創意構思。而今年也是我們首次接受與食物行業相關的項目參賽。

新冠肺炎疫情逼使我們適應「新常態」——或許這正是時機讓我們再次構想食物和服裝／紡織行業的發展，為了我們的下一代實現更加可持續的生活方式。

IDENTIFYING SIMILARITIES BETWEEN FOOD AND FASHION

生活為一體：食品與時裝的互通之處

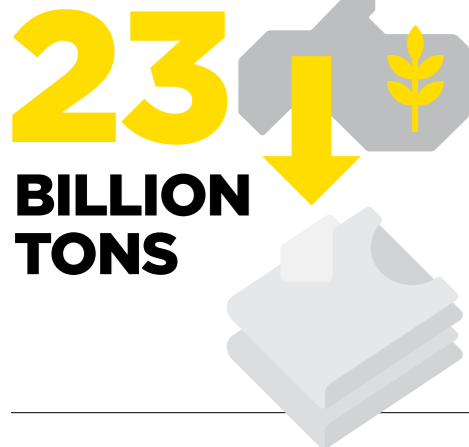


Image Courtesy: Unsplash, Infarm, HelloFresh, Provenance, Solar Food, Beyond Meat, abillionveg, Patagonia

The Mills Fabrica has been supporting techstyle innovation since its inception, nurturing startups and innovators working on material innovation, wearables and lifestyle brands and new retail experiences. Recently, Fabrica has expanded its innovation realm into AgTech and Food Tech. Food and fashion are two vital pillars within the lifestyle industry which are highly interrelated — from supply chain innovation, logistics, distribution and waste management to sustainable packaging, circular economy and new retail models, there is unlimited potential for both sectors to collaborate and share expertise.

南豐作坊一直以來支持 techstyle 創新，致力培育研發物料創新、可穿戴科技、生活時尚品牌或新零售體驗的初企和創新者。最近，南豐作坊開拓全新領域 —— 農業科技和糧食科技。食品和時裝是生活時尚範疇中的重要支柱，兩者息息相關：由供應鏈創新、物流、分銷、廢物管理、可持續包裝、循環經濟到新興零售模式，兩者具有合作和分享知識的空間。

THESE FIGURES SHED LIGHT ON THE RECENT TREND OF THE LIFESTYLE SUPPLY CHAIN - FROM PRODUCTION TO RETAIL.

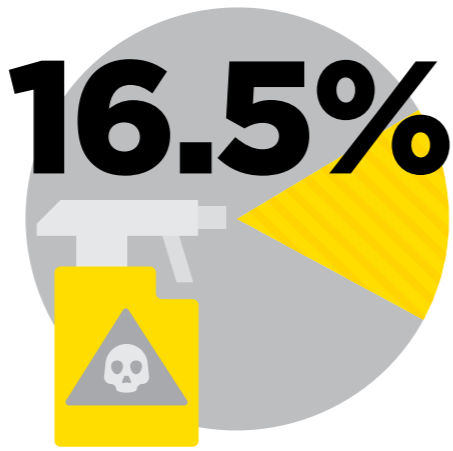


By 2030, the fashion industry is expected to use 35% more arable land to produce raw materials – enough to yield 23 billion tons of crops and livestock.

直到 2030 年，時裝行業將會用多 35% 的可耕地生產原材料。其土地用量足以生產 230 億噸糧食和牲口。

(Global Fashion Agenda)

由生產到零售，這些數據透露生活時尚範疇的當前發展情況。



Cotton farming only takes up around 2% of the arable land worldwide, but it accounts for 16.5% of pesticide use of the entire agriculture industry.

棉花耕作只利用全球 2% 的可耕地，但其殺蟲劑的使用量卻佔全球農業的 16.5%。

(Sustainability)

SUSTAINABLE AGRICULTURE SECURES OUR FUTURE GENERATIONS' RESOURCE SUPPLY

可持續農業 為未來世代確保資源供應



From food to fiber, the agriculture industry provides all of the necessary resources that we need to maintain our daily lives. However, after having adopted unsustainable farming methods over the past few decades, the industry is facing a sequence of issues from soil erosion, land degradation and arable land scarcity to resource depletion, posing one of the greatest threats to our future generations. The current situation inspires startups and innovators to develop solutions to alleviate the risk.

Nitrogen is one of the most important nutrients for growing healthy plants – but only if we use it correctly. The industry has long been utilizing an excessive amount of nitrogen-based fertilizer, not only contaminating the soil and drinking water, but also supplying the microbes more nutrients than they need, which will eventually induce the microbes to release more nitrogen dioxide depleting the atmosphere. Innovators see precise control as the key to enabling farmers to use water and fertilizer more sustainably. Earlier this year, Breakthrough Energy Ventures, an impact investor network convened by Bill Gates, led a whopping 100 million

USD Series C investment round in Pivot Bio. This Berkley-based AgTech startup creates self-sufficient ecosystems in the soil by genetically modifying the microbes, allowing them to release an optimal amount of nitrogen in the root to meet plants' nutritional needs, reducing the use of nitrogen-based fertilizer.

Apart from farming methods, transportation also contributes significantly to carbon footprint. According to a report published by Oxford University in 2019, the agriculture supply chain accounts for 16% of the carbon emissions of the entire farming industry, while transportation alone makes up 6% of the footprint. Hence, urban farming could be an alternative to cut down carbon footprint by reducing the distance between farms and end-customers. Infarm is a Berlin-based startup helping restaurants and grocery stores to set up indoor farms, allowing them to sell freshly harvested vegetables to their customers. Its indoor farms are remotely controlled by a cloud-based system, providing the perfect amount of light, water and nutrients to the plants. As a result, 5 million km of transportation and 8 hectares of land can be saved for every 2,000 indoor farms built.

Some of these agricultural solutions could also be used to grow fiber, empowering the fashion industry to build up a more sustainable supply chain at the source. The fashion brands featured on page 13 demonstrate a regenerative farming approach, fusing innovative agricultural practices with fashion design. Both the fashion and food industries are in need of innovations that can help achieve a truly sustainable ecosystem. A handful of proven solutions have been used to facilitate the supply chain to shift to sustainable practices. The London-based startup Provenance, develops a track-and-trace solution powered by blockchain, which has been used by coffee beans farmers, grocery stores, home textile producers and fashion brands. Its solution increases the traceability and transparency of products by providing every stakeholder – farmers, manufacturers, retailers and customers – detailed information at each stage of the supply chain.

由食物到纖維，整個農業為我們提供日常生活的必需品。可是，經過多年採用不可持續的耕作方式，行業正面臨土壤流失、水土流失、可耕地不足、資源耗盡等一連串的問題，為我們下一代的生活埋下種種威脅。現今情勢啟發初企和創新者，發展突破性方案舒緩有關危機。

氮是讓植物健康生長的其中一種重要元素——如果我們使用得當。農業業長久以來過度使用氮基肥料，不僅污染土壤和飲用水資源，也同時向土壤裏的微生物提供過量營養，誘使他們釋放二氧化碳，侵蝕地球的大氣層。創新者一直以來認為精準控制能有效幫助農夫更準確、可持續地使用水資源和肥料。今年初，比爾·蓋茨成立的影響力投資者聯盟 Breakthrough Energy Ventures 向 Pivot Bio 領投 1 億美元的 C 輪投資，幫助這家總部設於加州柏克萊的農業科技初企，發展一套幫助土壤自給自足的生態環境。他們借基因改造微調微生物，讓他們在植物根部釋放僅足以迎合植物營養需要的氮，帶領行業減少使用氮基肥料。

除了耕作方式，農業運輸也是行業碳排放的主要禍兇。根據牛津大學在 2019 年發表的報告，整個農業的碳排放量有 16% 來自供應鏈，而光是運輸一環便佔了 6%。因此，都市農業能夠幫助行業縮短農地和顧客之間的距離，為行業提供減少碳排放的替代方案。像是來自柏林的初企 Infarm，幫助餐廳和零售商建立室內農場，讓他們能夠向顧客售賣新鮮採摘的蔬果。他們的室內農場由雲端系統合適地控制光源、水份和營養；而每建立二千個室內農場，更能節省 5 百萬公里的運輸路程和 8 公頃的土地。

部分農業方案也可以應用於栽種纖維，讓時裝業界從源頭建立更可持續的供應鏈。我們在第 13 頁為您介紹幾家採用可再生農業方針的時裝品牌，把創新的農業作業模式與時裝設計互為結合。而不論農業食品還是時裝業，他們都需要創新技術完善整個可持續生態環境。現在市場上已經有好幾個經實證的方案，幫助供應鏈轉移到更可持續的作業模式。位於倫敦的初企 Provenance 借助區塊鏈建立了一套追蹤方案，已經被咖啡、豆、食品商店、家具紡織用品製造商和時裝品牌採用。他們的方案為農夫、製造商、零售商和顧客等持份者，提供供應鏈內每個環節的詳細資訊，大大提升產品的追蹤度和透明度。



33% of the arable land in the world are used for livestock production.

全球 33% 的可耕地，正用作飼養牲口。

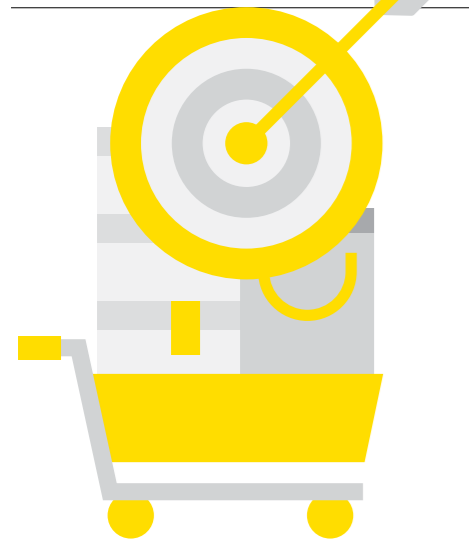
(FAO)



The agriculture supply chain accounts for 16% of the carbon emissions of the entire farming industry.

運作農業供應鏈所產出的碳排放量，佔整個農業產業的 16%。

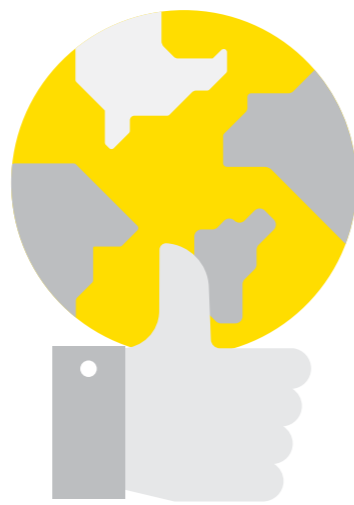
(Oxford University)



65% of millennials prefer to buy purpose-driven products.

65% 的千禧世代偏好購買「宗旨驅動」(purpose-driven) 的產品。

(Harvard Business Review)



96% of consumers believe their actions can contribute to a better world.

96% 的千禧世代相信他們的行動能夠締造更美好的世界。

(Futerra)



88% of consumers expect brands to help them live a more eco-friendly lifestyle.

88% 的千禧世代期望品牌幫助他們實現更環保的生活。

(Futerra)



The sales of sustainable lifestyle products grow 5.6 times faster than others.

可持續生活產品銷售量的增長率，比其他產品快 5.6 倍。

(Stern's Center for Sustainable Business, NYU)



FOOD AND FASHION PRODUCTION ARE ON THE SAME TRACK

食品時裝 發展軌跡雷同



The conventional farming industry is facing enormous pressure on land scarcity, leading to competition for land between fiber, food and livestock. Although innovators have developed solutions to improve soil quality and farming practices, the food supply chain cannot solely rely on limited land resources — seeking for alternative food supply is a priority. While Infarm's urban farming solution is an exemplar of departing from on-field traditional farming, ingredient innovation and alternative foods are also paving the way for a more sustainable and renewable food industry.

As the awareness of sustainable living has been rising over the past few years, the demand for plant-based products is continuously surging. The global plant-based meat market is expected to reach 35 billion USD in 2027 (Food Industry Executive), and Beyond Meat is undoubtedly the leader in this space. According to a recent interview by the New York Times, the American plant-based company is valued at 14 billion USD — proving that a plant-based diet is no longer a niche lifestyle choice. Beyond Meat produces plant-based meat using various types of beans, potato starch and plant-based oil, which consumes 99% less water, 93% less land and 43% less energy. Therefore, plant-based diets are not only kind to animals, but also to our mother nature by significantly reducing environmental footprint.

Ingredient innovation pushes the boundaries of Food Tech even further, subverting the conventional agri-food supply chain with disruptive ingredients. The Finnish startup Solar Food uses electricity to extract carbon dioxide and hydrogen from water, then feeds the extraction with bacteria, resulting in a single-cell protein called "Solein". The wheat flour-like protein contains fat, carbohydrates and minerals, which can be used as an ingredient to produce baked goods, protein drinks, or even burger patties

without using a kernel of bean — corroborating its profound statement "disconnect food production from agriculture." Having said that, carbon dioxide is present throughout the process - in fact, it is captured as part of Solein during fermentation. Moreover, the electricity used is powered by solar energy, emitting 100 times fewer greenhouse gases than raising cattle. It also yields 1,000 times more than raising cattle using the same size of land, making it a highly resource-efficient ingredient.

The fashion and food industries have always been on the same trajectory, embracing a more sustainable approach by using similar technologies. Like Bolt Threads (page 12) and Evocative Design (page 17), we have seen many examples of adopting bio-design and additive manufacturing in fashion or industrial design. And now, the food supply chain is also probing into these technologies, aiming to increase annual yield alongside a lower environmental footprint. While raising cattle usually takes at least one year from birth to slaughter, cultured meat developed by the Israeli-based startup Future Meat only takes 14 days to grow, providing a more time-efficient solution for the food supply chain. Besides its efficiency, cultured meat is cleaner than regular ranch-raised meat as it uses 90% less water and emits 80% less greenhouse gases. Another Israeli startup, Redefine Meat, also develops animal-free meat using 3D printing technology, allowing retailers and restaurants to produce meat on-demand. "Future Meat" sounds like science fiction, but these are not far-fetched innovations as both startups are expected to launch their products by 2021, pushing the agriculture industry one more step towards a farm-free era.

傳統耕作行業面對土地稀缺的巨大壓力，導致耕種纖維、食物和牲口之間的土地競爭。雖然創新者發展了不少改善土壤品質和耕作方式的方案，但是食物供應鏈不能只依賴有限的土地供應，尋找替代的食物供應是他們逼切的任務。上文提到的 Infarm 便是一個極好的例子，讓行業脫離農地的傳統耕作模式。同時，原料創新和替代食品也同時締造可持續和可再生的食品行業。

過去幾年，消費者對可持續生活方式的意識日漸提高，因此，市場對植物性產品的需求也不斷提升。全球植物性肉類市場預計在 2027 年達到 350 億美元，而 Beyond Meat 無疑是行業中的佼佼者。根據《紐約時報》的訪問，他們現在市值 140 億美元，反映植物性飲食已經不是小眾的生活方式。他們利用豆類、馬鈴薯澱粉和植物油製作其產品，比起傳統肉類少用 99% 水資源和 93% 的土地，也少消耗 43% 的能源。因此，植物性飲食減少了不少環境足跡，不僅是對動物善良，也是充分體現對大自然的愛護。

原料創新也推動了糧食科技的發展，透過創新的食物原料顛覆傳統農業糧食供應鏈的發展。來自芬蘭的初企 Solar Food 利用電力分解水中的二氧化碳和氫，然後利用細菌加以發酵分解物，繼而形成其單細胞蛋白質產品「Solein」。其味道與小麥麵粉相似，能夠製作烘焙食物和蛋白質飲料，甚至不需利用任何豆製品生產漢堡肉，印證其宗旨「讓糧食生產脫離農業」。雖然生產過程會衍生二氧化碳，但其實二氧化碳在發酵過程已經被同化成為 Solein 的一部分。至於生產過程使用的電力來自太陽能發電，比養殖家畜產生少 100 倍的溫室氣體；而利用同樣面積的土地，更比養殖家畜產出多 1,000 倍的收成，是資源效益極高的食物原料。

其實，時裝和食物行業一直在同樣的軌跡上發展，利用類似的科技推動可持續模式。像 Bolt Threads (第 12 頁) 和 Evocative Design (第 17 頁) 等例子，便在時裝和工業設計中採用生物設計和增材製造等技術。而最近食品行業也正探索這些科技，希望以低碳方式提升每年的收成。牲口通常需要養殖一年才能屠宰，而以色列的創新公司 Future Meat 研發的培植肉類只需要 14 天便能長成，為食品行業提供一個具時間效益的替代方案。此外，培植肉類也比農場養殖節省 90% 的水資源，更排放少 80% 的溫室氣體。另一家以色列初企 Redefine Meat 採用 3D 打印技術生產無動物肉類，讓零售商和餐廳能夠按需求生產肉製品。「未來肉」聽起來像是科幻小說的情節，但它們絕不離地——因為這兩家初企預計 2021 年前會推出產品，推動農業發展「零農地」的年代。



INNOVATIVE E-RETAIL SOLUTIONS IMPROVE THE CUSTOMER JOURNEY

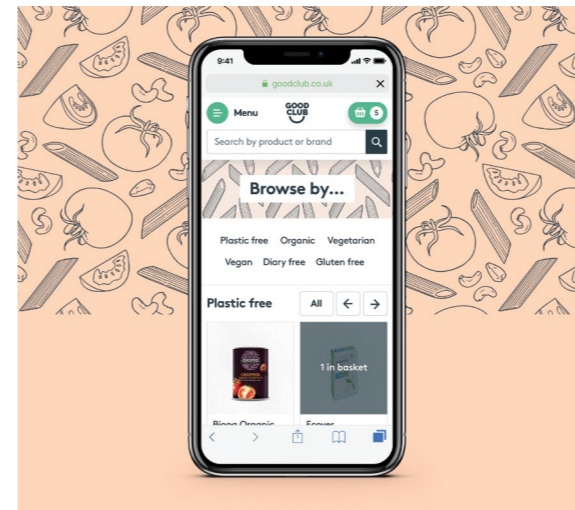
創新電商方案 改善顧客旅程



E-commerce has been thriving for years as most lifestyle retailers have built up their online channels to create a ubiquitous presence for their brands and products. But the e-grocery sector was an exception — customers used to be skeptical about the quality of online grocery shopping because they are not able to choose the products in person. The lack of trust between retailers and customers was one of the major setbacks for the e-grocery sector. It also requires a multitude of resources for traditional grocery stores shifting from the brick and mortar model to the e-commerce arena. Despite that, the current pandemic provides customers and grocery startups a second chance to re-explore the online grocery shopping experience. Startups are also taking this opportunity to introduce sustainability to their businesses.

For example, the London-based startup, Good Club, focuses on selling local sustainable products using reusable and non-plastic packaging, setting an example of a zero-waste and closed-loop e-grocery business. Meal-kit subscription is another disruptive model that has changed the operation of the grocery sector. In addition to saving customers' travel time to the grocery store, it provides an all-in-one service to their customers - from developing recipes and calculating the nutritional value to recycling meal-kit boxes. The competition within this field is very fierce - while Blue Apron lost 30% of its users in just one year, another leading meal-kit service provider HelloFresh recorded a 42% y-o-y growth in 2019, suggesting a promising future for the most adept and competent players.

Retail technology such as payment and fulfillment solutions also enable e-retailers to improve the customer journey. Amid the pandemic, it plays an even more important role in engaging online customers in times of social distancing, facilitating



retailers to operate business as usual. The British retail tech startup Smartzter develops a solution that allows retailers to lay an interactive tag over campaign videos, increasing the conversion rate of retailers' social media campaigns. Initially mostly used by luxury fashion brands, its founder Karoline Gross told us in the previous issue of *Fabrica.Weave* that its solution can also be applied to enhance the customer experience of buying food and beverage online.

We've mentioned that the lack of trust and infrastructures were the major hurdles for the online grocery sector. In fact, according to McKinsey's report, unstable supply was also an obstacle for the grocery sector to develop online channels. Stable supply reduces the bounce-back from customers, but COVID-19 is causing disruptions throughout the supply chain. These startups' solutions enable retailers to predict demand effectively during and after the pandemic: Crisp is an American tech company that forecasts food supply by collecting and analyzing yield and sales data. Its solution helps the food supply chain better predict the demand, resulting in less food waste. Similarly, Chain of Demand, a Fabrica incubatee, has developed an AI-powered forecast technology that allows retailers to reduce excessive inventory by predicting future demand more accurately.

電商市場一直發展蓬勃，不少生活品牌已經成立網上渠道，為他們品牌和產品製造無所不在的效應。但電子食品市場卻是個例外。由於顧客不能親自揀選產品，因此對網上食品銷售有所質疑。零售商和顧客間缺乏信任，是電子食品市場其中一個絆腳石；此外，對建基於傳統實體商店模式的食物商店來說，他們需要龐大的資源轉移到電商模式。即便如此，近來的疫情為顧客和食品行業再次提供探索電子食品市場的機會，而初企也把這個時機，把可持續發展的概念引入其事業之中。

舉個例子，來自倫敦的 Good Club 主力售賣本地生產的可持續產品，也堅持使用可再用和零塑膠的包裝產品，為食品行業樹立零廢棄、閉環運作的示例。而訂購快餐餐盒（又稱料理懶人包）也改寫了食品行業的運作模式。他們不僅幫助消費者節省來回超級市場的時間，更為他們提供一站式的服務——由建立食譜、計算營養成分到回收餐盒，他們都照顧周到。可是，這範疇的競爭非常激烈：Blue Apron 在 2019 年一年內流失 30% 的客戶，而業內另一家龍頭公司 Hello Fresh 卻錄得 42% 的按年增長，意味只有具競爭力的公司才能受惠於這行業的樂觀前景。

電子付費和訂單履行方案等零售科技，有助電商提升顧客的體驗。這在疫情時期更飾演著重要的角色，幫助零售商與顧客溝通、維持正常服務，減低社交距離措施帶來的影響。英國零售科技初企 Smartzter 建立的方案，讓零售商在廣告影片上添加互動標記，提升社交媒體廣告的轉換率。本來這技術的主要用家為時裝和化妝品牌，但其創辦人 Karoline Gross 曾向《Fabrica.Weave》表示，該技術同樣能夠提升食品和飲料網上銷售的體驗。

我們提到缺乏信任和基本配備，是電子食品行業的主要障礙；而根據麥肯錫的報告，不穩定的庫存供應也是食品商店建立網上渠道的羈絆之一。穩定的供應能夠減少顧客流失，不過，供應鏈因疫情受阻，讓他們難以控制庫存供應。這些初企的方案，幫助零售商在疫情前後有效地預測供求：Crisp 是一家美國的科技公司，透過收集和 analyzing 分析成品的銷售數據預測糧食供應。他們的方案幫助糧食供應鏈預測需求，避免不準確的預報導致糧食遺廢棄。而在時裝行業，南豐作坊培育公司 Chain of Demand 利用人工智能建立出一套預測科技，讓零售商準確地預測需求，從而減少過剩庫存。



FOOD AND FASHION: A HOLISTIC SUSTAINABLE LIFESTYLE

食品與時裝：
一體化的可持續生活



Sustainable or plant-based living are not just about eating vegan meat or using cruelty-free products, but a full embodiment of one's lifestyle choice. Consumers with a higher consciousness of sustainable consumption expect retailers to provide them with a full range of sustainable offerings. Outdoor clothing brand Patagonia (page 15) is known for being a long-time supporter and advocate of sustainability. They have launched a spin-off food brand, Patagonia Provisions, to celebrate the regenerative farming practices adopted by both its garment and food production, providing its customers a full experience of sustainable living.

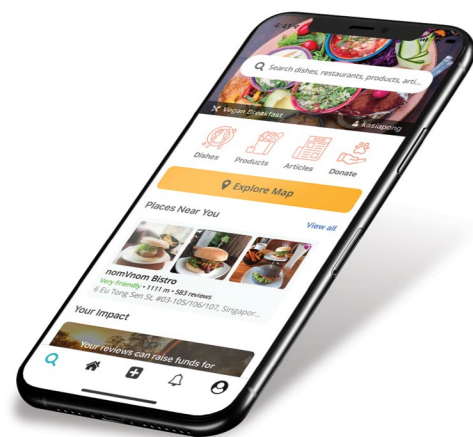
Fabrica is supporting a few Singaporean startups that empower consumers to celebrate a plant-based lifestyle through their digitized platforms: Green is the New Black is a media company that provides their readers with stories about conscious living and an online marketplace to buy sustainable products. While abillionveg is a plant-based version of Yelp or OpenRice — a review platform, where its users can search and write reviews for plant-based restaurants and products, creating credentials for the yet-to-be-seen plant-based market. Vikas Garg, CEO of abillionveg tells us more about his company's mission in his interview on page 22.

In this article, we have explored various examples of how fashion and food are closely tied together. We believe there are countless opportunities for both industries to join forces to spur innovation in the future when we take a holistic approach of the lifestyle industry.

說到底，可持續或植物性生活方式並不光是吃吃素肉和購買免於殘忍的產品，而是全方位生活體驗。消費者對可持續消費的意識日漸提高，並期望零售商為他們提供全面的可持續產品。像是長期支持可持續發展的戶外服裝品牌 Patagonia (第 15 頁)，他們在幾年前開發食品支線「Patagonia Provisions」，採用相同的再生耕作方式開發食品和服裝產品，為消費者提供周全的可持續生活方式。

南豐作坊所支援多家新加坡初企，也正透過他們的數碼化渠道推廣植物性生活方式：Green is the New Black 是一家媒體公司，為讀者提供「有意識生活」的資訊外，也建立了出售可持續產品的網店。而 abillionveg 像是素食版「Yelp」或「開飯喇」：其評論平台幫助顧客尋找植物性產品，也讓他們評論素食餐廳和產品，幫助尚待開發的植物性市場建立口碑。請翻到第 22 頁閱讀 abillionveg 行政總裁 Vikas Garg 的訪問，他將會在訪問中分享其公司的願景。

這篇文章中的多個例子，為您剖析食品和時裝之間的緊密關係。如果我們視整個生活時尚範疇為一體，相信這兩個行業未來有更大的空間，合力推動創新發展。



REPURPOSING FOOD IN FASHION AND TEXTILES

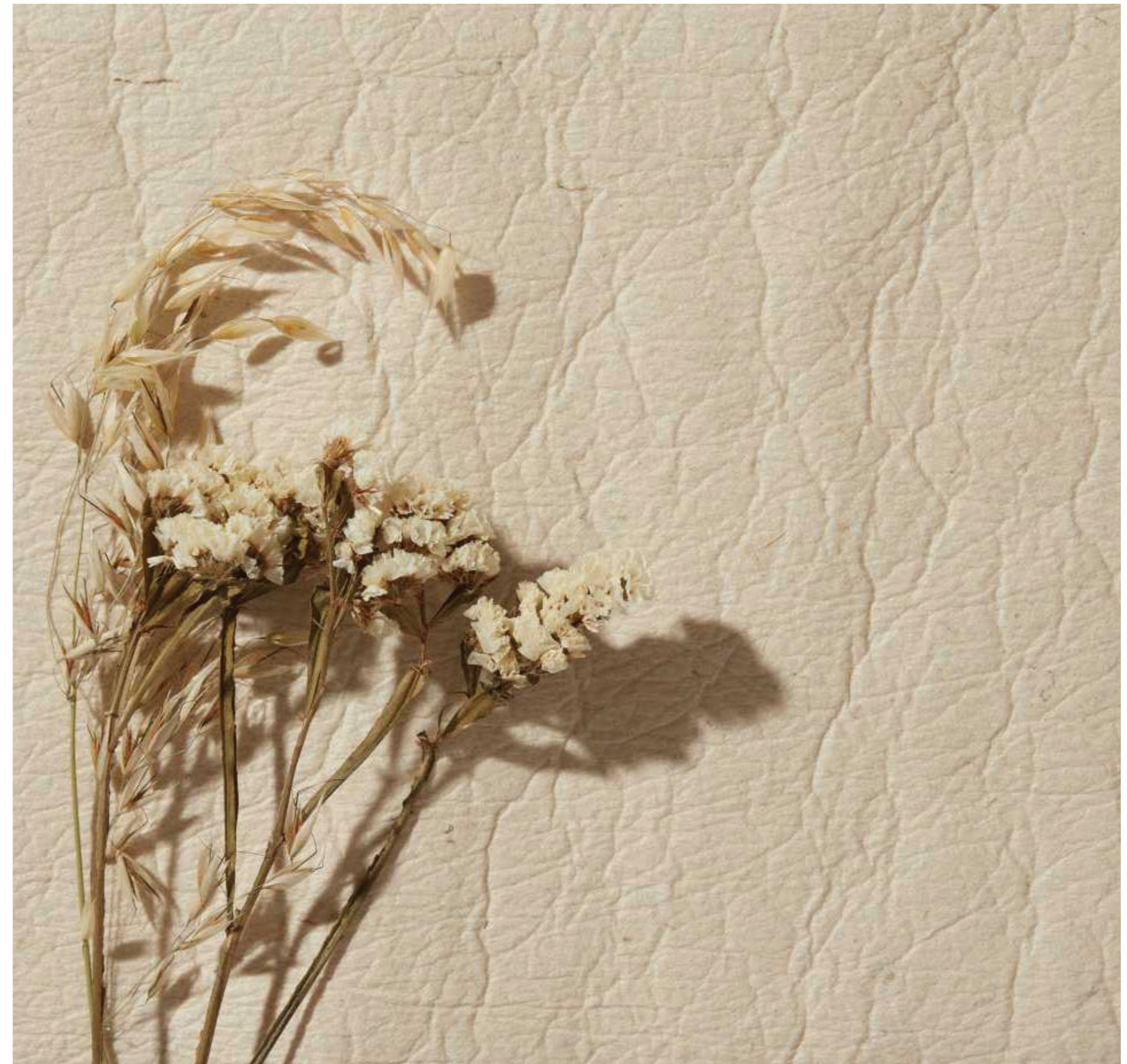
時裝紡織原料 食物全新應用



In addition to turning post-consumer food waste and crop residues into compost or redistributing to people in need, the agri-food supply chain can also transform them into raw materials for producing fashion and textile products, creating an inter-industry circular economy.

除了將消費後廢棄食物和殘餘農作物用作堆肥，或者把它們分配予有需要的人，農業糧食供應鏈也可以將它們轉化成為生產時裝及紡織產品的原材料，造就跨行業的循環經濟。

Image Courtesy: Ananas Anam, Mi Terra, Unsplash, Circular Systems, Fruit Leather, Archroma, Botanical Colors, Bolt Threads



USING FOOD WASTE AS FEEDSTOCK FOR TEXTILES

廢棄食物成紡織原料

The United Nations' report shows that 1.3 billion tons of food are wasted every year, making it one of the most concerning societal and environmental issues in the world. Handling domestic food waste could be as easy as putting a compost bin in the kitchen, but collecting industrial food waste from restaurants, hotels or food producers involves more parties and procedures, creating hurdles for the industry to handle food waste sensibly.

A handful of aspiring startups and innovators are attempting to tackle this issue by streamlining the process of turning discarded food into fabrics, building a sustainable future for both the fashion and food industries.

Decades ago, textile producers discovered that casein, a substance found in milk, can be used as a feedstock for producing cotton-like fabric by blending it with acrylic. Since it is not entirely organic and can be easily substituted with cheaper synthesized fibers like polyester, the value of milk fabric was questionable and had never been widely used by the industry until recently. Material innovators have now successfully optimized the production of "milk fabric" without incorporating any non-organic substances. This breakthrough gives milk fabric a second chance to disrupt the market.

聯合國的數據顯示每年有超過 13 億噸食物廢棄，是當今最嚴重的社會和環境問題之一。我們平常在廚房添置肥料箱，便可以處理家居食物殘渣；但是，要收集餐廳、酒店和食物生產商所製造的廢棄食物，牽涉眾多人手步驟，成為行業妥善處理廢棄食物的阻礙。

幾家具抱負的初企和創新者透過精簡回收過程解決這個問題。他們把廢棄的食物轉化成為面料，同時為糧食和時裝行業建立更具可持續性的未來。

幾十年前，紡織品生產商已經發現牛奶中的酪蛋白 (casein)，能夠和丙烯酸樹脂 (acrylic) 聚合成跟棉花相似的面料。但由於這不是全有機的物料，也輕易被聚酯纖維等更便宜的聚合物料所取代，因此「牛奶面料」的價值一致存疑，也未被廣泛使用過。直到最近，物料創新者成功改良這種面料的生產方式，再也不需要混合任何非有機物質。這突破給牛奶面料一個全新的機會；Mi Terro 是一家來自美國加州的初企，

Mi Terro, a startup based in California, develops a series of proprietary processes that extract casein from discarded dairy products, resulting in purified casein that can be spun into breathable and anti-bacteria yarn. Likewise, the German startup Q Milk collects inedible dairy by-products from ranches and turns them into pellets for producing fabrics and cosmetics.

Coffee is another beverage that we consume the most nowadays - over 160 million burlap bags of coffee beans in 2019 according to the International Coffee Organization. While coffee provides us with an energy booster in the morning, the leftover coffee grounds going into landfill emits an intolerable amount of methane gas that threatens the environment. In order to reduce coffee waste, industrial designers have been reusing coffee grounds to produce tableware like coffee cups. As a versatile material with various applications, coffee grounds can also be used as a feedstock for fabric production. Singtex, a material innovator based in Taipei, collects the coffee grounds from Columbian farmers at fair trade price and reengineers them into yarns through an energy-efficient process. The performance fabrics made from the coffee grounds have been used by over 50 well-known fashion brands such as New Balance, Oakley and Patagonia.

透過其專有流程萃取廢棄奶製品中的酪蛋白，經過淨化後便可以紡織成透氣、抗菌的紗線。同樣地，德國初企 Q Milk 從農場收集牛奶副產品，然後轉化成為用作生產紡織品和化妝品的微粒。

另外，咖啡也是當今人類經常飲用的飲料；國際咖啡組織估計，全球人類在 2019 年飲用超過 1.6 億包咖啡豆。咖啡在每天早上幫我們提神醒腦後，剩下的咖啡渣落入堆填區，排放危害環境難以承受的甲烷。為了減少廢棄咖啡渣的數量，工業設計師早已經利用咖啡渣作為生產咖啡杯等餐具的原料。其實咖啡渣用途非常廣泛，除了製作餐具，也能夠成為紡織物的原材料。像是位於台北的物料創新公司 Singtex，便以公平的價格從哥倫比亞的農夫中收集咖啡渣，再利用具能源效益的方式，把它們再造成為紗線。他們的功能面料已經被 New Balance、Oakley 和 Patagonia 等超過 50 家知名時裝品牌採用。

DON'T BURN CROP RESIDUES — WEAVE THEM INTO CLOTHES

不再焚燒 給殘茬編織新生

To prepare the field for sowing new crops, the agricultural industry commonly burns excessive crop residues like wheat straws and corn husks. Setting the field on fire seems to be a cost-efficient method, but the true cost behind it is unbearable - field burning leads to air pollution, wildfire, extreme microclimates and many other catastrophic consequences. According to the Food and Agricultural Organization of the United Nations, 1.3 million gigagrams of CO2 were emitted from field burning in 2017, and over 255,000 tones of crop residues were burnt in Southern Asia alone.

Crop residue is a highly adequate yet overlooked feedstock for producing materials. The agricultural industry generates 380 million tons of it every year which is left unused. Circular Systems, the winner of the H&M Foundation's Global Change Award 2018, is one of the pioneers that turns crop waste into biomaterials. With the mission of creating a zero-waste agricultural industry, the innovative startup coverts banana tree trunks, pineapple leaves, rice straws, sugar cane stalks, oilseed flax and other leftover organic matters collected from

為了準備播種，焚燒是農產業最常用清理農地中小麥秸稈和玉米殼等多餘作物的方法。一把火就可以解決的事——這聽起來是處理殘株最具效益的方法，但背後的代價卻難以承受。焚燒農地引致空氣污染、火災、極端微氣候等災難性的後果。根據聯合國糧食及農業組織，2017 年農地焚燒排放超過 130 京克的二氧化碳，而光在南亞地區，便燃燒了超過 25 萬 5 千噸殘餘農作物。

每年有 3.8 億噸殘餘農作物被閒置，可見殘餘農作物的供應量十分充足，但我們卻忽略其生產物料的價值。2018 年 H&M Foundation 的 Global Change Award 勝出者 Circular Systems 便是這個領域的先行者；其創辦人以創造零廢棄農產業為使命，把殘餘農作物轉化成為生物物料。他們從農地收集香蕉樹幹、菠蘿葉、稻米秸稈、甘蔗莖部、阿麻籽等有機物質後，把它們再造成低成本、可堆填的生物物料「Agraloop」。一如上文提到的 Singtex, Circular Systems 同樣以公平的價格從農夫手中回收殘餘作物。這不僅在財政上支援低收入地區的農夫，並同時鼓勵行業重用這些具價值的資源。

the farms into "Agraloop", a low-cost bio-material that is compostable. Like Singtex, Circular Systems also pays farmers from lower-income communities a fair price for the crop residues, not only financially supporting farmers in developing countries that have long been exploited, but also incentivizing the industry to reuse these lucrative resources.

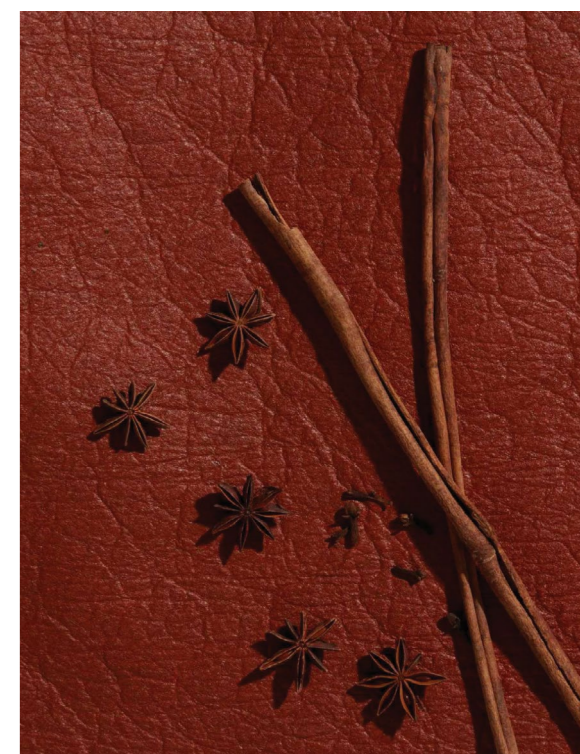
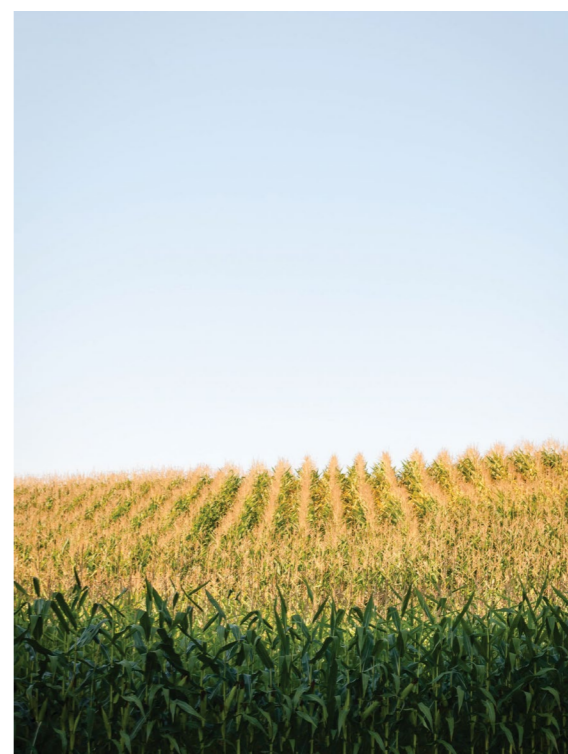
Fruit by-products are probably the most recognized regenerative resources among all crop residues, as many of them have been successfully commercialized in the market. Piñatex and Orange Fiber are early-movers in this space, turning banana leaves and orange bagasse into vegan leather and vegan silk, which have been used by high-fashion brands like Hugo Boss and Salvatore Ferragamo. The Rotterdam-based startup Fruit leather is another up-and-coming material innovator, who saves discarded mangos from being wasted by converting them into durable and tenacious vegan leather that comes in different colors and textures.

由於不少初企已經成功將其創新方案商品化，使水果副產品成為眾多殘餘作物中最為人認識的原料。例如 Piñatex 和 Orange Fiber 便是這個領域的先驅；他們將蕉葉和香橙渣淨轉化成為植物皮革和絲綢，更被 Hugo Boss 和 Salvatore Ferragamo 等高級品牌採用。來自荷蘭鹿特丹的 Fruit leather 是另一家後起之秀。他們收集被廢棄的芒果，再造成耐用、堅韌的植物皮革，更可以按需要生產不同顏色和尺寸。

THE AVAILABILITY OF MAJOR AGRI-RESIDUES IN THE WORLD 全球主要殘餘農作物供應量

TYPE OF AGRI-RESIDUE 殘餘農作物種類	AVAILABILITY (MILLION TON/ YEAR) 供應量 (百萬噸 / 年)
SUGAR CANE BAGASSE 甘蔗渣	39
BAMBOO 竹	36
CORNHUSK 玉米殼	64
BANANA LEAVES 蕉葉	233

Source: fashion2fiber.com



DYEING TEXTILE WITH FOOD WASTE

利用廢棄食物為染料



The textile industry has been notorious for discharging dye wastewater for decades. An academic journal published by a group of Bangladeshi scholars in 2019 estimates that 40,000 m² of wastewater were discharged daily in Bangladesh alone, one of the largest garment production hubs in the world. Denim is known to be the most polluting fabric not only because it takes up to nearly 3,000 gallons of water to produce just one pair of jeans, but also because the hazardous chemicals manufacturers use in the washing process contaminate the marine ecosystem.

Luckily, food waste turned into natural and sustainable fabric dyes allows us to give fashion a tint without tainting nature. Archroma, a Swiss company specializing in developing industrial colorants, uses inedible herbs and nutshells collected from the agri-food supply chain to produce fabric dye. The company also improves the transparency of its supply chain, where customers can trace the source of the dyes by scanning the smart tag attached to the clothes. American dye studio Botanical Colors is another champion of organic dyes, upcycling fruits and vegetables such as rhubarbs and pomegranates into non-toxic and biodegradable dyes. The studio also hosts workshops to educate the industry on how to dye fabric using less water, empowering the fashion industry to embrace a thorough sustainable practice.

多年以來，紡織行業一直是排放染料污水的元兇。孟加拉是全球其中一個大型服裝生產基地，當地一班學者在 2019 年發表的學術文章指出，該國每天排放 4 萬立方米的污水。而眾多面料中，生產牛仔布是產生污染可算是最多，不僅僅是因為每生產一條牛仔褲需要消耗 3,000 加侖的水，用作洗水的有害化學物質更污染整個海洋生態系統。

幸好，廢棄食物也可以成為天然、可持續的紡織染料，為服裝增添色彩而不使環境受到污染。Archroma 是一家研發工業用染料的瑞士公司，他們從農業糧食供應鏈中回收不能食用的草本植物和堅果殼後，繼而生產成為紡織染料。他們為了提升供應鏈的透明度，在衣服上貼上智能標籤，讓顧客藉掃描得知染料的來源。來自美國的染料工作室 Botanical Colors 是另一家推廣有機染料的公司，他們升級再造大黃和石榴等蔬果成為無毒、可降解的染料。除了生產染料，他們也透過舉辦工作坊，教育業界如何在染布的過程中少用水資源，鼓勵時裝業採用全面的可持續生產方式。



Image Courtesy: Fibershed, Trace Collection, California Cloth Foundry, Patagonia

MUSHROOMS GROWN FOR WEARING

種而為穿的菌菇



Lab-grown fibers do not involve livestock and use less land, offering a cruelty-free and resource-efficient option for the fashion industry to produce fiber. Combining them with crop residues makes it even more eco-friendly. Bolt Threads, the renowned material startup based in the US, extracts sugar from corn waste and puts it through fermentation with yeast and water, resulting in vegan silk that has been used by Stella McCartney for its collections. The company also develops soft and durable vegan leather by injecting organic matters like discarded corn stalks into mycelium cells, fully utilizing every single part of crop residue in creating new materials.

From food to fashion and farm to laboratories, solutions mentioned in this article are only a few examples of how interdisciplinary collaborations give food a second life by repurposing them in the fashion and textile industry. These examples also show us that by pushing boundaries and being innovative, we can create a self-sustaining techstyle industry and a zero-waste future for generations to come.

實驗室培植的纖維並不牽涉到養殖牲口，所用的土地也比較少，因此為時裝行業提供一個免於殘忍和具資源效益的方式生產纖維。而當實驗室培植技術和殘餘農作物交錯時，更為行業衍生出更具可持續性的選項。知名美國物料初企 Bolt Threads 回收廢棄玉米，萃取其中糖分後添加水分和酵母，培植成為植物絲綢；他們的物料已經被品牌 Stella McCartney 使用多季。除了植物絲綢，他們也把玉米殼等有機物注入菌絲體，培植出柔軟耐用的植物皮革，充分使用各種廢棄作物生產全新物料。

由食物到時裝、農場到實驗室，這篇文章提到的只是一小撮的跨界合作方案。我們透過重新利用食物發展時裝和紡織行業，從而給廢棄食物新生。這些例子也讓我們看見突破界限和創新思維，將有助我們建立自給自足的 techstyle 行業，也為我們的下一代創造零廢棄的未來。

REGENERATIVE FASHION: MENDING THE DAMAGED PLANET WITH BETTER FARMING PRACTICES

可再生時裝： 用更好的耕作方式修補地球

In the previous story, we introduced a handful of startups demonstrating the possibility of repurposing food waste in the fashion and lifestyle industries. On the other hand, reusing fashion waste in the agriculture industry is still a developing field. However, four trailblazing initiatives and brands featured in this story ensure every bit of fashion waste will be re-used to nourish the land through bringing about regenerative fashion.

我們在前一篇文章，分享了好幾家初企把廢棄食物用於時裝和生活時尚行業之中。但另一邊廂，在農產業中利用廢棄時裝仍屬發展之中。雖說如此，本文介紹的四個時裝項目和品牌，便透過實現可再生時裝，確保所有時裝廢棄都會用作滋養土地。



WHAT IS REGENERATIVE AGRICULTURE

甚麼是再生農業

By adopting regenerative methods like reforestation, low-till or no-till farming, farmers will be able to minimize carbon footprint by cultivating better soil structures that store nutrients and captures carbon dioxide.

透過造林、低耕或免耕農業等可再生耕作方式，有助農夫培育出品質更佳的土壤，不僅能儲存更多養分，還可以捕獲二氧化碳，有助減低農業碳足跡。

FORMING A ROBUST REGENERATIVE COMMUNITY

建立強大再生社群



FIBERSHED

FIBERSHED.ORG



Founded by Rebecca Burgess in 2010, Fibershed is an NGO based in California that advocates a self-sustaining "soil-to-soil" system. By teaming up with farmers, textile producers, brands and retailers in the region, the NGO is building up a circular ecosystem where textile products are farmed, dyed, designed, produced and composted within a 250-km radius in northern California, minimizing the carbon footprint of textile production through an onshore regenerative production system.

Fibershed 是一家在位於美國加州的非牟利機構，由 Rebecca Burgess 在 2010 年成立，主力推動自給自足的「從土壤到土壤」系統。他們和區內的農夫、紡織生產商、品牌和零售商合作，建立一個循環系統——所有紡織產品都是在北加州方圓 250 公里內耕作、染色、設計、生產和堆肥。他們期望藉在岸可再生生產系統，減低紡織生產過程中的碳足跡。

To date, over 150 producers spanning across the region have joined Fibershed's program and promised to farm and source locally and regeneratively. According to its assessment report, each garment produced with its current soil-to-soil system emits 3.6 kg of CO₂. The NGO hopes that all members will fully adopt solar-derived energy in the near future, resulting in carbon-negative textile products.

至今，當地有超過 150 家生產商加入他們的計劃，並承諾採用本地、可生長的耕作和採購模式。根據他們的評估報告，採用從土壤到土壤系統生產一件服裝，排放 3.6 公斤的二氧化碳。他們期望所有會員能夠在短期內全面採用太陽能發電，達至負碳排放的紡織生產模式。

A FULL-BLOWN SUSTAINABLE FASHION MOVEMENT

全面可持續時裝運動



TRACE COLLECTIVE

THETRACECOLLECTIVE.COM



Trace Collective is a London-based fashion brand that aims to reduce the fashion industry's carbon footprint, water usage and energy consumption. By combining regenerative farming practices and sustainable manufacturing methods, the brand uses 50% less energy and 90% less water compared to the traditional garment production process. Moreover, all fibers and garments are grown and made in Europe, already allowing the saving of over 1,000 kg of CO₂ on transportation since its launch in January 2020.

Trace Collective 是一家基地設於倫敦的品牌，以減低時裝行業碳足跡、用水量 and 能源消耗為使命。他們結合可再生耕作方式和可持續生產模式，比傳統服裝生產少用 50% 能源和 90% 水資源。此外，所有纖維和服裝都是在歐洲種植和製造；由他們在 2020 年 1 月成立至今，已經成功減少超過 1,000 公斤因運輸而產生的二氧化碳。

The brand also avoids producing post-consumer fashion waste by providing its customers with lifetime repair service and encouraging them to return unwanted garments for upcycling into new products. As the fibers used to produce garments are entirely regenerative and biodegradable, it allows the brand to turn some of the used garments into compost to increase soil fertility, demonstrating a truly soil-to-soil business model.

他們也避免製造消費後時裝廢物，因此向顧客提供永久的修補服務，也鼓勵顧客回收不再穿的服裝，讓他們可以升級再造成全新的產品。因為用作生產時裝的纖維是可再生和可降解，因此他們可以用部分使用過的服裝作堆肥之用，不僅可促進土壤的肥沃度，也同時展示「從土壤到土壤」的營商模式。

CLOTHES MADE TO COMPOST

作堆肥的服裝

CALIFORNIA CLOTH FOUNDRY

CLOTHFOUNDRY.COM/REGENERATIVE

CALIFORNIA CLOTH FOUNDRY



California Cloth Foundry (CCF) founder Lydia Wendt has been working in the fashion industry for over 20 years, including with world-renowned brands such as Tom Ford and Calvin Klein. By using her expertise in fashion design, she founded California Cloth Foundry, a renewable fashion brand that commits to using natural dyes and regenerative fibers to produce garments. As CCF's garments are made from regenerative and plant-based fabrics, customers can simply compost the used item, providing nutrients to the soil after use.

California Cloth Foundry 的創辦人 Lydia Wendt 曾經在時裝行業工作超過 20 年，當中不乏知名品牌如 Tom Ford 和 Calvin Klein。借助她於時裝設計的經驗，她成立了可再生時裝品牌 California Cloth Foundry，承諾使用天然染料和再生纖維製造產品。由於面料都是可再生和植物性纖維所造，因此大部分服裝都可用作堆肥，顧客可以把不再穿的衣服埋在土壤裏，便可以滋養土地。

However, the brand has admitted that the garment isn't entirely compostable, as its sewing threads are made of spandex, a material derived from fossil fuel. Therefore, the brand is now working with material innovators on developing bio-based threads replacement. CCF also promotes and sells natural fabrics grown, spun and finished locally in California, enabling more players of the fashion industry to adopt them.

不過，品牌承認不是整件服裝都能夠堆肥，因為石油基物料氨綸仍然是用作生產縫線的主要原料。因此，他們正與多個物料創新者研發生物基縫線，取代傳統的物料。除了生產可再生服裝，CCF 也是一個售賣天然面料的平台，推廣在加州本地生長、紡織和製造面料，幫助時裝行業採納可再生生產方式。

REGENERATION FOR THE FUTURE GENERATIONS

為新生代再生

PATAGONIA

PATAGONIA.COM



Patagonia has been leading the way in sustainable fashion for decades, celebrating fair trade and responsible production by joining forces with different NGOs and initiatives. The brand is one of the founding members of Regenerative Organic Certified, an NGO empowering farmers' rights and promoting organic farming practices. "Road to Regenerative" is its pilot collection that fully adopts regenerative cotton fairly and organically grown in India. Partnering with Bluesign®, a system that enables textile producers to trace and monitor supply chain operations, the brand can guarantee its customers that products are manufactured sustainably and safely.

Patagonia 一直是可持續時裝的先驅，透過與多個非牟利機構和項目合作，推廣公平貿易和責任製造。他們是非牟利機構「可再生有機認證」(Regenerative Organic Certified) 的其中一個始創成員，致力推動農夫權益和有機耕作方式。而「Road to Regenerative」是他們首個完全採用可再生棉花的系列，所用纖維都是在印度公平、有機地生長。加上他們採用 Bluesign® 系統，讓紡織生產商追蹤和監察供應鏈運作，也因此他們能向顧客確保產品在可持續和安全的環境下生產。

The size of arable land is decreasing every year, leaving food and fiber to compete for land to grow. Nevertheless, Patagonia believes food and fibers can be grown in harmony without fighting for limited land resources. The brand launched its spin-off venture "Patagonia Provisions" 5 years ago, using the same regenerative framework to farm and source food. By doing so, Patagonia envisions a future where food and fibers will not deplete, and soil will be nurtured continuously.

可耕作土地面積逐年減少，逼使糧食和纖維競爭土地生長。不過，Patagonia 認為兩者能夠和平共生，而不需要爭奪有限的土地資源。他們在 5 年前成立周邊食品品牌「Patagonia Provisions」，利用同樣的可再生框架種植和採購食物，構想一個糧食和纖維資源不會耗盡的未來，使土壤和人類生活同時得到滋養。

USING FOOD WASTE TO CREATE WASTE-FREE PACKAGING

When Sten Gustaf Thulin invented plastic carrier bags as a reusable solution, little did he know that it would cause irreversible devastation to our mother nature. According to WWF's latest report, the food and retail sectors generate at least 8 million tons of plastic waste every year, putting the marine ecosystem in danger. In order to tackle this issue, startups featured in this story have developed bio-based solutions using food waste and crop residue, enabling retailers and end-customers to minimize the usage of petroleum-based packaging.

利用廢棄食物
製造零廢棄包裝



當 Sten Gustaf Thulin 發明塑膠袋為循環再用的方案時，並不知道會為地球帶來難以逆轉的災害。根據世界自然基金會的報告，食物和零售行業每年生產 800 萬噸塑膠廢物，大大危害海洋生態的安全。為了解決這個問題，這篇文章介紹的初企利用廢棄食物和殘餘農作物，研發出一系列生物基方案，藉此幫助零售商和顧客減少使用石油基包裝產品。

Image Courtesy: Better Packaging, Novamont, Notpla, Doeat, Make Grow Lab, Ecovative Design

THE BETTER PACKAGING CO.

THE BETTER PACKAGING CO.

HEADQUARTER 總部 Auckland, New Zealand
新西蘭奧克蘭

MATERIALS 物料 Corn Starch, Corn Husk, Wheat Straw
玉米澱粉、玉米殼、小麥秸稈

As e-commerce sales rise due to stay-at-home orders amid the pandemic, the use of packaging has also surged. To reduce waste, Auckland-based 'Better Packaging' produces compostable packaging and labels using crop by-products like corn husks and wheat straws, causing significantly less pollution than petroleum-based packaging. Certified as home-compostable, the packaging breaks down with other organic waste after 180 days.

因應疫情下的居家令，電商銷售量不斷上升，也促使產品包裝的用量大增。而來自奧克蘭的 Better Packaging 便透過研發可堆肥的包裝和標籤，減低包裝廢物的數量。他們利用玉米殼和小麥秸稈生產包裝，減低有機包裝為環境帶來的影響。他們的包裝產品被認證為可家居堆肥，跟其他家居有機廢物一同處理後在 180 天內分解。



BETTERPACKAGING.COM

NOVAMONT



HEADQUARTER 總部 Novara, Italy
意大利諾瓦拉

MATERIALS 物料 Corn Starch, Vegetable Oil
玉米澱粉、蔬菜油

Mater-bi is a biodegradable plastic developed by Novamont using cornstarch and vegetable oil, which can be used to produce a wide range of compostable products such as cling film, mailing bags and carrier bags. Like Better Packaging's products, Mater-bi is certified as home compostable. Mater-bi is also biodegradable and soluble in the ocean, mitigating marine plastic pollution caused by petroleum-based products.

Novamont 利用玉米澱粉和蔬菜油，研發出可降解塑膠 Mater-bi。此物料擁有多種用途，能用作生產保鮮膜、郵寄袋和塑膠袋。一如 Better Packaging 所生產的物料，他們的產品也是被認證為可家居堆肥。此外，Mater-bi 能在水中降解和溶化，減低石油基物料對海洋生態帶來的污染。



MATERBI.COM

NOTPLA

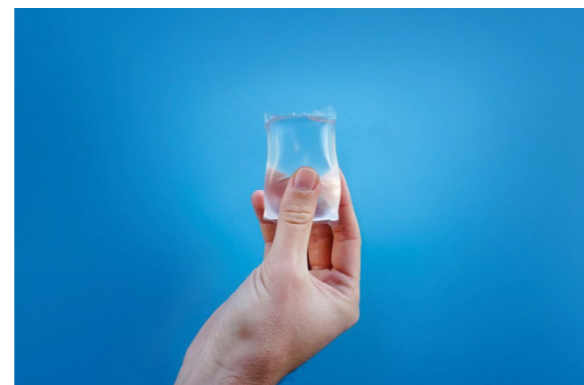


HEADQUARTER 總部 London, UK
英國倫敦

MATERIALS 物料 Brown Seaweed
褐海藻

You may have seen on social media marathon runners being given small pouches of water — this intriguing plastic-free solution is a cutting-edge innovation developed by Notpla — a bio-based plastic made from brown seaweed that can be used to produce edible sachets containing beverages or condiments. Since growing brown seaweed does not require fresh water and fertilizer, it is one of the cleanest resources in the world. The startup is currently developing a machine that allows event organizers and restaurant owners to produce biodegradable packaging on-site and on-demand.

你可能在社交媒體上看過馬拉松比賽向跑手派發飲用水膠囊，而這有趣的零塑膠方案，其實是 Notpla 的創新研發。他們利用褐海藻製作出生物基塑膠，能夠生產可食用的飲料或醬料包。由於養殖褐海藻不需要使用活水或肥料，也因此這是最潔淨的資源之一。他們正在研發一台能夠讓活動主辦單位和餐廳負責人根據需要即席製造出生物可降解包裝的機器。



NOTPLA.COM

DOEAT



HEADQUARTER 總部 Mont-Saint-Guibert, Belgium
比利時蒙聖吉貝爾

MATERIALS 物料 Potato Starch
馬鈴薯澱粉

Styrofoam takeout boxes and single-use plastic cutlery are toxic and non-biodegradable, creating devastating plastic pollution within nature. In order to encourage the food industry to eliminate single-use products, DoEat transforms potato starch and water into compostable and edible bowls. These potato-based bowls are flavorless and hence will not affect the taste of the dish. The resilient starch-based material can withstand high heat, allowing food producers to make the bowl as part of the dish by baking or deep-frying them with other ingredients.

發泡膠外賣餐盒和單次使用的餐具都是不能降解的有毒物質，為地球帶來災難性的塑膠污染。為了鼓勵餐飲行業取締單次使用產品，DoEat 透過混合馬鈴薯澱粉和水，製造可堆肥、可食用的餐碗。雖然產品的原料是馬鈴薯澱粉，但它們是無味的餐具，因此不會影響到食物本身的味道。此外，這澱粉物料非常強韌，能夠抵禦高溫，即使是焗烤煎炸也毫無問題，讓餐碗成為菜色的一部分。



DOEAT.COM

WASTE-FREE PACKAGING

MAKE GROW LAB



HEADQUARTER 總部 Pulawy, Poland
波蘭普瓦維

MATERIALS 物料 Vegetable Waste
廢棄蔬菜

It was initially a project studying the cellulose structure of kombucha scoby, which unexpectedly turned out to be a compostable packaging solution. By fermenting vegetable waste, Make Grow Lab develops a bio-based material that can be used to produce packaging or vegan leather. Inheriting the tenacious texture of scoby, it is water-resistant and 40 times stronger than paper, making it suitable for packing fresh food or other wet products. As the material is self-adhesive, producers can also wrap the products without using any plastic tapes.

這本身是一個研究紅茶菌酵母纖維素結構的項目，但意想不到地成為一個可堆肥包裝的方案。團隊透過發酵廢棄蔬菜，研發出一種可生產包裝或純素皮革的生物基物料。如同紅茶菌酵母的堅韌質地，這種防水物料比紙張強韌 40 倍，適用用作包裝食物或其他濕貨。此外，由於這是自黏的物料，讓產品製造商包裝時省卻塑料膠帶。



MAKEGROWLAB.COM

ECOVATIVE DESIGN



HEADQUARTER 總部 New York, US
美國紐約

MATERIALS 物料 Mushroom
菌菇

Ecovative Design has used mycelium (the root of mushrooms) to develop packaging that is compostable and biodegradable in just 45 days, making it much more environmentally friendly than petroleum-based products. Mycelium and other organic matters injected into a stencil, grow a water resistant and heat-insulating materials in 7 days, providing a time and cost-effective packaging solution for the retail industry.

Mushroom Packaging 是 Ecovative Design 利用菌絲體研發的物料。這可堆肥的菌菇物料能夠在 45 天之內分解；跟石油基產品相比，這可是對環境帶來的負擔減到最低。Mushroom Packaging 的科技和生產過程非常簡單：把菌絲體和其他有機物質注入模板後，便會在 7 天後長出防水、隔熱的物料，為零售行業帶來快捷、划算的包裝方案。



MUSHROOMPACKAGING.COM

AgFunder is a US-based venture capital firm, investing in technologies that enable the agri-food industry to approach a more sustainable future. In this interview, its founder Michael Dean talks us through the recent development of the landscape of agri-food innovation, and how the firm supports innovators that make changes happen within this sector.

AgFunder 是來自美國的創投公司，向推動農業糧食行業邁向可持續未來的科技注資。在這篇訪問中，他們的創辦人 Michael Dean 會跟我們講解農業糧食創新的當前發展，也會談及他們如何幫助創新者在這行業中推動變革。



Image Courtesy: AgFunder, UnSplash, Atomo, Mycoworks, WeFarm, Simulate

AGFUNDER: TRANSFORMING THE AGRIFOOD ECOSYSTEM

AGFUNDER:
改寫農業糧食生態系統



WHAT IS THE MISSION OF AGFUNDER?

AgFunder is a digital venture capital platform with a mission to invest in technologies to rapidly transform our food and agriculture system. We publish AgFunderNews and offer our members the ability to invest in our funds. Our current fund is the Grow Impact Fund, which will invest in the technologies that will deliver a sustainable and equitable food system.

COULD YOU PLEASE SHARE WITH OUR READERS A FEW THRIVING AREAS IN AGRIFOOD TECH THAT WE NEED TO WATCH AT THE MOMENT?

Alternative proteins and cellular agriculture will ultimately provide viable and affordable alternatives to animal protein production. New plant-based alternative protein products are offering consumers healthier alternatives to animal protein. It will be a little while before we see so-called cultivated meat on supermarket shelves, but there are a growing number of enabling technologies that will accelerate its development and affordable production.

Technologies like digital marketplaces will benefit smallholders by providing markets for their crops and affordable inputs for their farms. Robotics and automation technologies will deliver increased farm productivity and profitability.

Controlled Environment Agriculture (CEA) is another area primed for huge growth. Locally grown fresh vegetables and seafood will be a fundamental component of our "smart cities" of the future. Compact, high-yielding indoor circular systems will be the norm. Climate change is forcing us to adopt sustainable, energy-efficient controlled environment production systems that are able to preserve water and virtually eliminate environmental impact.

IoT and AI technologies are going to have a huge impact on the food system. Tiny hyper-spectral sensors detecting food quality and freshness while software platforms use machine learning to provide actionable insights on the ripeness, quality and display readiness of produce will materially cut food waste.

New technologies are creating circular economies from plastic waste by utilising pure enzymatic or bacterial digestion to convert it to useable molecules for the creation of new products. Other technologies are focused on creating new biodegradable, water-soluble and even edible plastic replacements from natural sources such as mycelium.

Biotechnologies such as genetic editing allow farmers to achieve greater yields through crops that perform well in marginal environments and can tolerate low rainfall, salinity, heat and diseases. They require much less chemical application and reduce greenhouse gasses in the atmosphere through avoided deforestation, as farmers no longer need to clear land to maintain yields due to land degradation.

MANY AGTECH STARTUPS HAVE EMERGED WITH THE MISSION OF SUPPORTING SMALLHOLDER FARMERS, HOW DOES AGFUNDER SUPPORT THESE STARTUPS?

Our Grow Impact Fund is a standard 10 year fund, but with our Singapore based Grow Accelerator and our global network of over 85,000 members, we are able to provide our startups with access to a whole range of people and organisations who will help drive their development, such as corporate or NGO partners to trial their technology, potential customers, investors or talent. As our network is global, we can introduce them into new markets much quicker than they could otherwise achieve. Like most technologies, agriculture and food technology innovation will mostly be developed for advanced markets and then adapted for emerging market farmers. Digital marketplaces, robotics as a service, aerial hyperspectral imaging for farmer decision support and pest detection and digital financial services are all good examples of this.

AGFUNDER 的使命是甚麼？

AgFunder 是一家數碼創投平台，我們的使命是向迅速改變農業糧食系統的科技注資。除了發佈「AgFunderNews」，我們也讓會員向 AgFunder 的基金注資。現在，我們透過基金「Grow Impact Fund」向造就可持續、公平糧食系統的科技注資。

您可以為我們的讀者分享一下當前需要留意的農業糧食科技嗎？

替代蛋白和細胞農業最終會為我們提供切實可行、經濟實惠的方案取代動物蛋白生產。新興的植物性替代蛋白產品，為顧客提供比動物蛋白更健康的選擇。我們還需要一段時間在超級市場貨架上看到所謂的「培植肉類」；不過，推動這個範疇以低成本生產的使能科技，正在不斷增長之中。

如數碼化商城等科技會有利於小型農戶，一方面為市場提供他們的農作物，而另一方面為農場提供價格相宜的物資輸入。另外，機械人科技和自動化科技將會幫助農場提升生產力和盈利能力。

監控環境農業 (Controlled Environment Agriculture，簡稱 CEA)，是另一個準備好迎接龐大增長的範疇。本地生產的新鮮蔬果和海產，會成為未來「智能城市」的基本元素；密集、高收成的室內循環系統將會成為常態。氣候改變逼使我們採用可持續、具能源效益的環境監控系統，讓我們可以保護水資源外，也可以利用虛擬的方法，取締行業對環境的影響。

物聯網和人工智能科技也對糧食系統起重要的作用。微型的高光譜傳感器能感應食物品質和新鮮度；而採用機器學習的軟件平台所提供的行動資訊，則讓我們了解農產品的熟成度和品質，也讓我們了解產品是否準備好在商店展示，有助我們大大減少糧食浪費。

新科技正為我們創造循環經濟，像是利用酶或細菌消化轉化廢棄塑膠成為製造新產品的分子。而其他科技則集中利用菌絲體，創造可降解、可溶於水中，甚至可食用的替代塑膠產品。

基因編寫等生物科技改善在邊緣化環境生長的農作物，使它們能夠承受低降雨量、高鹽度、炎熱氣候和植物疾病，大大提升農夫的收成。由於這些科技讓農夫不再需要面對水土流失，他們不用為了維持收成而清理農地，避免出現森林砍伐之餘，化學品的使用量也大減，並同時減少排放溫室氣體在大氣之中。

不少農業科技初企的使命是支援小型農戶，AGFUNDER 如何支援這些初企？

我們的「Grow Impact Fund」是一個維持 10 年的定期基金，不過我們位於新加坡的「Grow Accelerator」和全球網絡內的 85,000 位會員，為初企提供全面的人際和機構網絡。這些企業和非牟利機構夥伴會試用他們的科技外，也會提供潛在客戶、投資者和人才，以推動他們的發展。也正因為這是一個全球網絡，他們能透過我們的幫助，更迅速地進入全新的市場。一如大多數的科技，農業及糧食科技一開始都是為進階市場而設，再被新興市場的農夫採用，例子包括：數碼化商城、機械人為服務、幫助農夫決策和監控害蟲的鳥瞰高光譜成像 (aerial hyperspectral imaging)，以及數碼財政服務。



MICHAEL DEAN

Founder of AgFunder
AgFunder 創辦人

“PEOPLE ARE INCREASINGLY SEEKING NEW FLAVOURS AND EXPERIENCES IN THEIR FOOD AND BEING DIFFERENT IS GOOD, BUT DELICIOUS IS KEY.”

顧客在飲食方面，不斷尋找新的味道和新的體驗；與眾不同是好事，但好吃仍然是重點。

AGFUNDER HAS INVESTED IN A HANDFUL OF FARMING TECH STARTUPS — HOW DO THESE SOLUTIONS EMPOWER FARMERS TO IMPROVE FARMING PRACTICES?

Farmers everywhere face many crucial challenges. One of which is properly understanding what is happening on their farm. Information is the key to this and our portfolio companies such as The Yield, Solinftec, FieldIn, WeFarm and DeHaat assist farmers in very different ways and in different markets, but all with the same goal, to materially improve the productivity and profitability of their customers' farms.

HOW CAN AGTECH/ BIO MATERIALS HELP PROPEL A CIRCULAR ECONOMY IN FASHION?

There are many ways that biotechnology will be a key facilitator of the circular economy, ranging from leather made from mycelium to fabrics and plastics made from spoiled milk for example. The ability to produce functional, high performance fabrics which may be completely recycled or compostable to add value at the end of their lives is incredibly exciting. These products in-turn drive new economy opportunities in robotics and production methodologies.

COVID-19 HAS DRASTICALLY IMPACTED THE FOOD SUPPLY CHAIN. ESPECIALLY AT THE BEGINNING OF THE PANDEMIC, WE SAW THAT THE SUPPLY CHAIN WAS UNABLE TO RESPOND TO THE UNEXPECTED RISE IN DEMAND — HOW DOES FOOD TECH/RETAIL TECH HELP RESPOND TO THIS CRISIS?

Digitisation is a key driver of supply chain efficiency. Artificial Intelligence informed by data collected from sensors throughout the supply chain will provide visibility into real-time production and demand levels so that any imbalances can be predicted or more effectively dealt with. Artificial Intelligence models will be able to predict these imbalances so that production, transport and distribution can be adjusted in response, driving products to alternative outlets and direct-to-consumer opportunities to ensure waste is minimised. Automation and robotics are also going to play an increasingly major role in our future food system.



THE DEMAND FOR PLANT-BASED FOOD IS SURGING, MAKING MEAT ALTERNATIVES A VERY FIERCE MARKET — WHAT IS THE KEY TO STANDING OUT FROM THE COMPETITION?

There are three key components that we like to see when assessing plant-based foods, particularly in alternative proteins. The first is flavour. It may seem obvious, but the product needs to taste fantastic. It doesn't need to be a perfect facsimile of a particular protein, but it must taste great. People are increasingly seeking new flavours and experiences in their food and being different is good, but delicious is key. The second is ingredients. Covid-19 has highlighted the need for us all to adopt healthier diets and consumers are increasingly seeking foods that are natural, less processed and contain fewer ingredients. Alternative ingredients that are able to deliver on flavour, are healthy and sustainable are entering the market, which is incredibly exciting for the future of food. The third is marketing. It is no good having a fantastic product if consumers are unaware of it and as venture investors, the ability of a company to generate rapid consumer adoption and sales growth is vital. A great sense of product, branding and the correct channels to market are all vital in driving early customer adoption.

RECENTLY, AGFUNDER INVESTED IN THE INNOVATIVE COFFEE STARTUP ATOMO — HOW DOES INGREDIENT INNOVATION HELP THE SUPPLY CHAIN TO IMPROVE THE QUALITY AND SUSTAINABILITY OF F&B SUPPLY?

Atomo applies their proprietary process of combining compounds such as sugars and amino acids with a variety of upcycled food waste ingredients and then processing them to produce “coffee without the coffee beans”. Globally we waste or otherwise lose around a third of all the food we produce. We believe the strategy of identifying compounds that can deliver specific flavour profiles to waste ingredients to upcycle them and produce new ingredients or products has major implications for improving food security and waste management globally.

AGFUNDER 向好幾家耕作科技的初企注資，他們的方案如何幫助農夫改善耕作方式？

不管在哪裏，農夫都面對不少嚴峻的挑戰。其中一樣是正確地了解農地裏發生的事情，所以資訊是重中之重。我們的投資組合公司 The Yield、Solinftec、FieldIn、WeFarm 和 DeHaat 雖透過不同方式和市場協助農夫，但他們的目標都是一致的：大大提升農地客戶的生產力和盈利能力。

農業科技和生物物料如何推動循環經濟的發展？

生物科技在多個層面都是循環經濟的主要推手——由菌絲體製成的皮革，到利用過期牛奶製造布料和塑膠——能夠透過生產可完全循環再造或可降解的高性能布料，為生物在生命完結前增添價值，是一件令人十分振奮的事情。倒過來，這些產品也為機械人科技和生產方式帶來全新的經濟機遇。

新冠肺炎為糧食供應鏈帶來災難性的影響，特別在疫情初期，供應鏈不能應對突如其來的需求——糧食科技和零售科技如何幫助行業應對危機？

數碼化是推動供應鏈效益的主要因素。感應器收集供應鏈內的數據，促使人工智能幫助行業觀察即時的生產和需求水平，從而預測和有效地解決任何失調情況。由於人工智能模式能夠預測失調，行業因而可透過調整生產、運輸、分銷等過程回應相關情況。這也帶動產品到替代銷售點或直接面向顧客的機會，藉此減少產生浪費。自動化和機械人科技也將會在未來的糧食系統中擔當主要的角色。

植物性食品的需求正在上升，導致替代肉類市場競爭激烈。如何在這競爭中突圍而出？

特別是替代蛋白產品，我們審核植物性食品時具備三大條件：首先是味道。這聽起來可能很明顯——但產品一定要非常好吃。他們不需要複製特定蛋白產品——但一定要好吃。顧客在飲食方面，不斷尋找新的味道和新的體驗；與眾不同是好事——但好吃仍然是重點。第二是原料。新冠肺炎凸顯健康飲食的重要性，顧客也在找天然、少加工和含較少原料的食品。好吃、健康、可持續的替代原料已經加入市場，對食品業的未來來說非常振奮。第三是市場行銷。再好的產品如果沒有消費者留意到也是徒然，對風險投資者來說，迅速衍生顧客的能力和銷售增長至關重要。有質感的產品、品牌行銷和正確的市場渠道，都是吸引早期顧客的關鍵。

最近，AGFUNDER 向創新咖啡初企 ATOMO 注資——原料創新如何幫助飲食供應鏈推動品質和可持續發展？

Atomo 利用他們的專有流程合成糖、氨基酸和回收得來的廢棄食物，再把它們加工成為「沒有咖啡豆的咖啡」。全球浪費——或者說損失——三分之一的糧食生產。我們所相信的策略，是釐清甚麼化合物能夠為廢棄原料提供特定味道，並升級再造它們成為嶄新且有顯著效果的原料或產品，從而改善全球糧食供應和廢物管理。

THESE ARE A HANDFUL OF STARTUPS THAT AGFUNDER HAS INVESTED IN:

以下幾家是 AGFUNDER 所注資的農業糧食初企：

PORTFOLIO COMPANIES



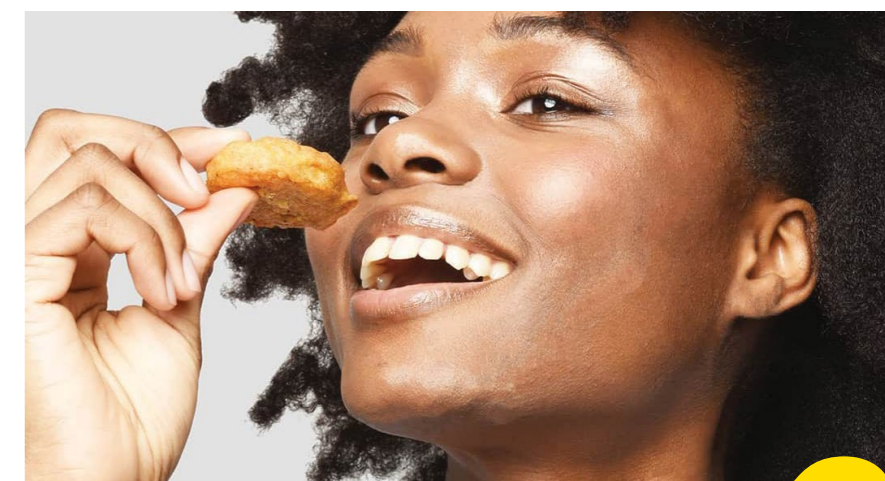
ATOMO COFFEE

SEED ROUND/USD 9 MILLION

種子輪 / 9 百萬美元

By using its proprietary molecular technology, Atomo is an ingredient innovator that makes coffee from upcycled and sustainable plant waste collected from the local farmers.

Atomo 是一家原料創新公司，從當地農夫回收可升級再造和可持續的廢棄草本植物後，借助其專有分子科技生產咖啡。



SIMULATE

SERIES A / ROUND SIZE UNDISCLOSED

A 輪融資 / 投資作價不公開

The startup develops a plant-based frozen chicken nugget “Nuggs 2.0” using advanced soy protein technology, giving eaters a hyper-realistic simulated texture of animal-based nuggets.

他們利用黃豆蛋白科技研發的急凍植物炸雞塊「Nuggs 2.0」，模擬動物雞塊的質感，給食用者超真實的體驗。



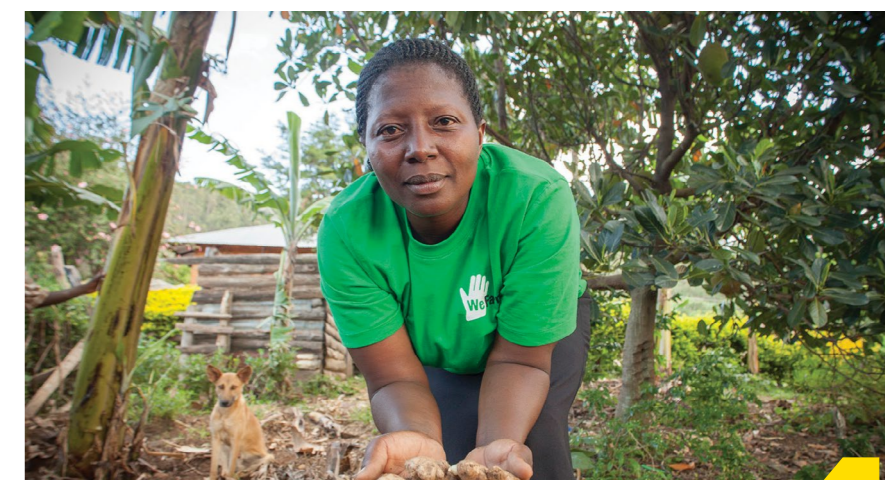
MYCOWORKS

SERIES A / USD 17 MILLION

A 輪融資 / 1,700 萬美元

The San Francisco-based material innovator develops “Reishi”, a high-quality and waterproof sustainable leather, from mycelium, which can be used to produce furniture, footwear and leather goods.

這家物料創新公司來自三藩市，利用菌絲體研發出高品質的可持續、防水皮革物料「Reishi」，可用作生產傢俬、鞋履或其他皮革製品。



WEFARM

SERIES A / USD 13 MILLION

A 輪融資 / 1,300 萬美元

The London-based purpose-led startup builds up a digitalized farmer-to-farmer network, empowering smallholder farmers in Eastern African countries to share knowledge, increase annual yield and gain market insight.

Wefarm 是一家宗旨為本的初企，他們的總部設於倫敦，主力建立數碼化「農夫到農夫」網絡，讓東非小型農戶分享知識、提升年產量和了解市場資訊。

The increasing demand for sustainable products drives the development of the plant-based market. abillionveg, a Fabrica portfolio company, develops an app-based platform where users can search and rate vegan products, propelling the growth of the market by creating an online community for sustainability-conscious consumers.

Vikas Garg, the founder and CEO of abillionveg, talks us through the landscape of the current plant-based market and how the platform helps businesses engage their customers.

對可持續產品與日俱增的需求，帶動植物性產品的發展。而南豐作坊的投資組合公司 abillionveg 便建立了一個讓用戶搜尋和評價植物性產品的手機應用程式，希望為具可持續意識的消費者建立網上社群，推動這個市場的發展。

在這篇訪問中，abillionveg 的創辦人及行政總裁 Vikas Garg 會跟我們分享植物性產品當前的發展，也會講解他們的平台如何幫助公司連結顧客。



Image Courtesy: abillionveg, Unsplash

ABILLIONVEG: BUILDING A CONTENT-BASED COMMUNITY FOR THE VEGAN MARKET

**ABILLIONVEG:
為素食市場建立內容群體**



“BEING VEGAN HAS BEEN ONE OF THE MOST UPLIFTING AND IMPACTFUL THINGS I’VE EVER DONE.”

「成為素食者是我做過的最令人振奮和最有影響力的事情之一。」

WHAT’S THE MISSION OF THE COMPANY?

Being vegan has been one of the most uplifting and impactful things I’ve ever done. But going vegan was a really hard journey and often felt like a sacrifice! So, I started abillionveg to make it much easier for people around the world to discover and enjoy this lifestyle. Our mission is to build a technology company that helps billions of people around the world transition to a much more sustainable way of life.

WHAT’S YOUR OUTLOOK ON THE PLANT-BASED MARKET IN THE NEXT 5 YEARS?

When we add up sectors like food, fashion, and beauty—we get to a global consumer market that’s more than \$6 trillion in annual sales. Sustainability is a big, global mega-trend for the next 20 to 30 years, and we think consumers are going to focus on plants. Our goal is to help 10-15% of the world’s population move to plant-based living in the next 10 to 15 years. That’s a big chunk of the consumer wallet.

WHAT’S YOUR COMPANY’S STRATEGY TO ENGAGE OMNIVORE USERS?

Nearly half of our members enjoy meat, fish or dairy on a regular basis. They’re part of the abillionveg community because the app and our members help them find vegan food or sustainable products wherever they want. The community is supportive, responsive and gives them a voice.

COMPARED TO FOOD PRODUCTS, IT’S HARDER TO FIND PLANT-BASED FASHION AND LIFESTYLE PRODUCTS IN THE MARKET. HOW DOES THE APP HELP USERS SEARCH FOR THESE PRODUCTS MORE EASILY?

Our members have helped us build the world’s largest directory of sustainable consumer products across sectors like food, fashion, beauty & wellness. We have more than 80,000 consumer products reviewed across 20,000 brands around the world. Members can find product information and soon will be able to connect to retailers near them or online where they can complete a purchase.

你們公司的使命是甚麼？

成為素食者是我做過的最令人振奮和最有影響力的事情之一。但是，成為素食主義者也是一個非常艱苦的旅程，我經常覺得這是一種犧牲！因此我決定成立 abillionveg，全世界的人能夠更容易地發掘和享受這種生活方式。而我們的使命是透過建立一家科技公司，幫助全球數十億人過渡到更具可持續性的生活方式。

你們如何預測未來 5 年的植物性產品市場的前景？

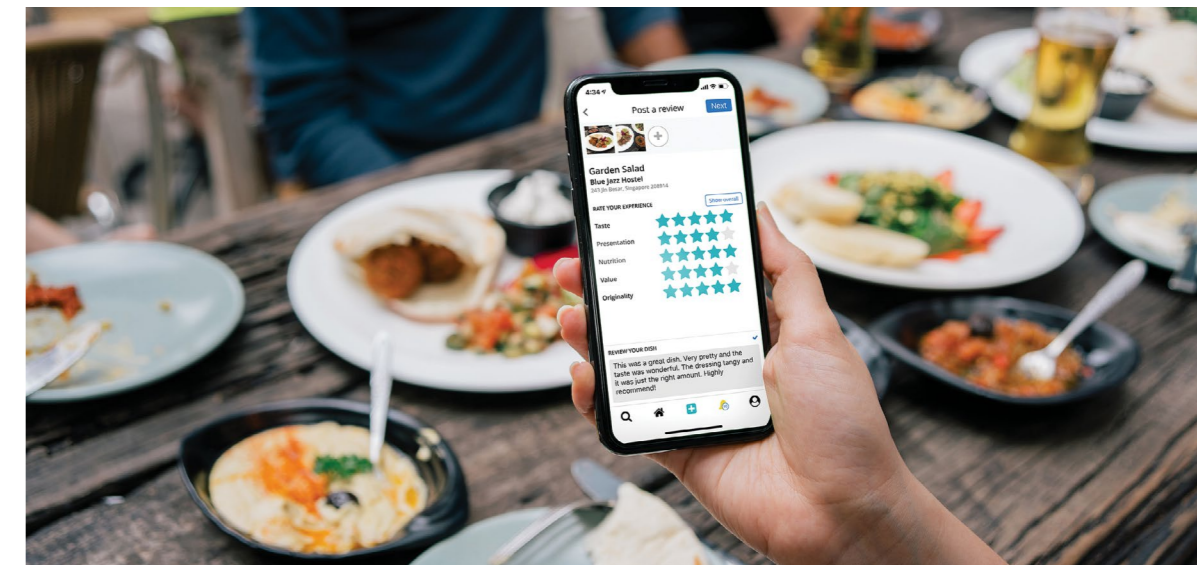
如果我們把食品、時裝和美妝行業一起計算，全球消費者市場每年銷售額高達 60 萬億美元。可持續發展將會是全球未來 20 到 30 年的大趨勢，而我們認為消費者將會聚焦在植物性產品上。我們的目標是在未來 10 到 15 年，幫助全球 10 至 15% 的人口轉移到植物性生活方式。那可是相當大一片的消費者市場。

你們有甚麼策略應對葷食用戶？

我們有幾乎過半數的用戶定期享用肉、魚或者是乳製品，而他們也是 abillionveg 社群的一部分；因為當他們有需要時，我們的手機應用程式和會員，會幫助他們尋找素食或可持續產品。這是一個充滿支持與反響的社群，也為大家提供發聲的空間。

跟食物產品相比，要在市場上尋找植物性時裝和生活產品相對較難。這個手機應用程式如何幫助用家更容易地搜尋這些產品？

會員們幫助我們建立全球最大的可持續消費產品名錄，其中包含食物、美妝和健康生活產品。而全球已經有超過 2 萬個品牌的 8 萬件產品被評價，會員可以輕鬆地尋找產品的資訊。不久將來，平台將會連結他們到就近的零售商或網店，好讓他們完成購物過程。



VIKAS GARG

Founder and CEO of abillionveg
abillionveg 創辦人及行政總裁

“OUR MISSION IS TO BUILD A TECHNOLOGY COMPANY THAT HELPS BILLIONS OF PEOPLE AROUND THE WORLD TRANSITION TO A MUCH MORE SUSTAINABLE WAY OF LIFE.”

「我們的使命是透過建立一家科技公司，幫助全球數十億人過渡到更具可持續性的生活方式。」

“OUR GOAL IS TO HELP 10-15% OF THE WORLD’S POPULATION MOVE TO PLANT-BASED LIVING IN THE NEXT 10 TO 15 YEARS. THAT’S A BIG CHUNK OF THE CONSUMER WALLET.”

「我們的目標是在未來 10 到 15 年，幫助全球 10 至 15% 的人口轉移到植物性生活方式。那可是相當大一片的消費者市場。」



**ABOUT ABILLIONVEG
關於 ABILLIONVEG**

The abillionveg app helps people around the world discover and share insights on vegan food and sustainable products. As a rapidly growing community for sustainability, it empowers users and businesses to make better choices for the environment and helps some of the planet’s most impactful nonprofits. The startup donates US\$1 to NGOs for every review on vegan food and products shared on its platform.

abillionveg 的手機軟件幫助全球人類尋找和分享素食和可持續產品的資訊。作為一個迅速增長的可持續社群，他們幫助用戶和公司為環境做更好的決定，並同時幫助世界上最具影響力的非牟利機構。只要平台上每出現一則關於素食產品的資訊，他們便會捐贈 1 美元予非牟利機構。

THE PLANT-BASED MARKET SEEMS TO BE MORE MATURE AND ACCEPTED IN THE US AND EUROPE. AS A SINGAPOREAN COMPANY, DO YOU FIND THAT ASIANS ARE ACTUALLY MORE ACCEPTING OF PLANT-BASED LIFESTYLES THAN WE THOUGHT?

There are 14,000 vegan dishes listed on abillionveg across nearly 3,000 restaurants in Singapore. Anecdotally it feels harder because there’s more media buzz around the growing vegan movement in the US or Europe, but it’s also happening here and all-around South-East Asia. Singapore is one of our ten most engaged markets globally and Indonesia also makes the top-10 out of nearly 130 countries.

CONTENT IS ANOTHER MAJOR FEATURE OF THE APP — HOW DOES THE REVIEW PLATFORM AND CONTENT SUPPORT EACH OTHER SIDE BY SIDE?

Like Facebook, Instagram or LinkedIn, we’re a platform for members, by members. That means authentic user-generated content. Member reviews form the foundation for everything we’re doing as an ecosystem, including our industry awards and certifications, activism, corporate engagement, and even donations we’re making to support conservation efforts around the world.

COVID-19 HAS CHANGED CONSUMER DEMAND AND BEHAVIOR. WHAT ARE THE RISKS AND OPPORTUNITIES YOUR COMPANY HAS DISCOVERED AMID THIS GLOBAL CRISIS?

This has been our best year and in particular Q2 was especially strong both for member and content growth. With restaurants around the world closed, many of our members shifted to using the app to find information about vegan products and review those they’re purchasing. We think this time will pass and a new sense of normalcy will arise, and we’re positioning ourselves to help our members complete all aspects of their lifestyle through abillionveg including purchasing what they’re looking for.

植物性市場的發展似乎在美國和歐洲比較成熟。作為一家新加坡公司，你覺得亞洲人對植物性生活方式的接受程度比我們想像中高嗎？

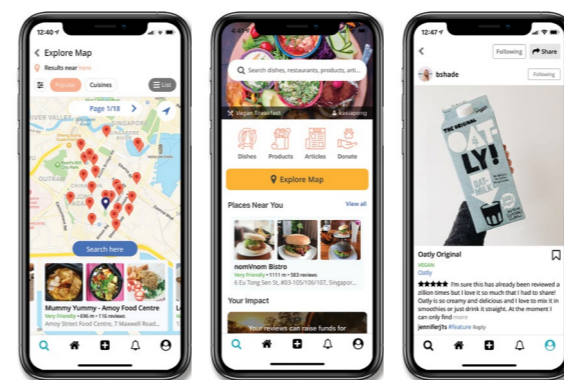
abillionveg 列出超過 3,000 家新加坡餐廳的 14,000 道菜色。因為媒體效應的關係，感覺上素食運動在美國和歐洲比較流行，但這也在新加坡和整個東南亞地區發生中。新加坡是我們全球十大活躍市場之一，而印尼也在 130 個國家中位列前十名的位置。

內容是手機應用程式的主要功能之一，你們的評論平台和內容如何互相結合？

就像 Facebook、Instagram 和 LinkedIn，我們是一個會員們口耳相傳的平台。這代表著我們的內容都是由會員真實地創造出來的。會員的評論造就我們這個生態系統的根基——這包括我們所獲得的行業獎項和認證、我們所帶領的行動、我們與企業的接觸，以至我們捐助全球各地支持環境保護的活動。

新冠肺炎改變了消費者的需求和行為。你們在這場全球浩劫中遇到甚麼危與機？

今年是我們表現最出色的一年，特別是在第二季，會員和內容的數量都錄得強勁增幅。全球不少餐廳結業，很多會員轉移到手機應用程式尋找素食產品的資訊，或者是在購買後留下評論。我們相信疫情終有一天會過去，隨之而來的將會是「新常態」。我們的定位是幫助會員利用 abillionveg 達成生活中的每個環節，當中包括購買他們想要的產品。



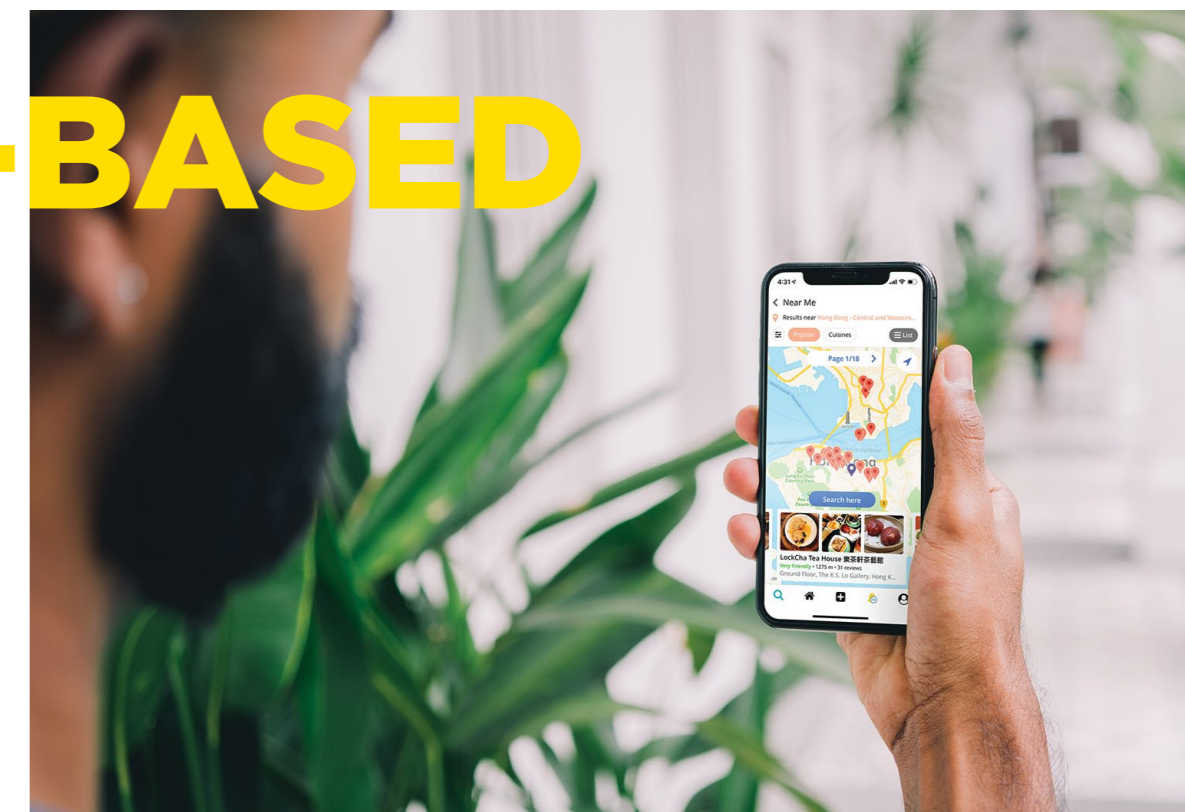
ON THE SUPPLY SIDE – ALTHOUGH FOOD ORDERING APPS AND OTHER DIGITIZED PLATFORMS HAVE EMBRACED THE OPPORTUNITIES ARISING FROM THE STAY-AT-HOME ORDERS, MANY RETAILERS AND RESTAURANTS HAVE BEEN AFFECTED BY THE PANDEMIC AND HAVE CLOSED DOWN THEIR BUSINESSES. HOW DOES ABILLIONVEG RESPOND TO THIS DYNAMIC SITUATION?

Hospitality will resurface. Things will get back to normal. People are social creatures. We’ve seen that during this crisis anytime some level of freedom comes back, everyone’s immediately on it. For us, restaurants are one part of our story. We’re working to make it easier for people to find vegan options, and that means building technology that allows us to spread information to decision-makers at tens of thousands of restaurants around the world every week. Direct to Consumer is also a big theme, and we’re seeing consumer food brands experiment with shipping directly. We’re excited to see this develop and we’ll find opportunities to partner with mission-aligned brands.

在供應方面，雖然很多外賣手機程式和數碼化平台都隨著居家令的機遇應運而生，不過也有不少零售商和餐廳受到疫情影響而結業。ABILLIONVEG 如何應對這個反覆的情況？

接待業將會從低谷浮面，所有事情將恢復正常。人是社交動物，我們在這場危機中看到，只要社會恢復一定程度度的自由，大家便二話不說享受這份自由。對我們來說，餐館造就我們其中一部分的故事。我們正理首幫大家更容易地找到素食選項；這代表著我們建立的科技，讓我們每個星期都能給全球成千上萬家餐廳的決策者傳播訊息。此外，直接跟消費者溝通是另一大主題。我們留意到食品品牌正嘗試直接給消費者遞送產品；我們很高興看到這個趨勢的發展，並會繼續尋找機會跟志同道合的品牌合作。

PLANT-BASED LIVING



CENTRAL SAINT MARTINS × THE MILLS FABRICA: SUPPORTING EMERGING INNOVATORS FOR THE TECHSTYLE INDUSTRY

中央聖馬丁藝術與設計學院 × 南豐作坊
表揚 TECHSTYLE 年輕創新者



The Mills Fabrica has been supporting talented innovators and designers from the world-leading creative college Central Saint Martins since 2018 by awarding its alumni with Techstyle and Sustainability Prizes. As Fabrica expands its innovative realm into Food Tech, this year is also the first time the prize awards projects related to the food industry, celebrating cutting-edge solutions benefiting both innovative food and textile spaces.

自 2018 年起，南豐作坊透過頒發南豐作坊 Techstyle 及可持續大獎，支持畢業於中央聖馬丁藝術與設計學院 (CSM) 的創新及創意人才。有鑑於南豐作坊涉足糧食科技，因此今年大會首次接受與食品行業相關的項目報名參加，表揚同時推動食物及紡織範疇的創新科技。



“

We are delighted to be supporting two more talented students from Central Saint Martins with residency at The Mills Fabrica in Hong Kong, which will help them in pursuing their dreams and providing them with the space, network and endless opportunities to further develop their innovative projects. Through our partnership with Central Saint Martins, The Mills Fabrica remains committed to working together in creating a better and brighter future for the techstyle industry.

我們很高興支援多兩位才華洋溢的中央聖馬丁藝術與設計學院學生。南豐作坊的駐場計劃將幫助他們完成夢想，並且為他們提供工作空間、人際網絡和無窮機遇，延續其創新項目的研發過程。通過與中央聖馬丁藝術與設計學院的合作，南豐作坊將繼續與各界共同建立 techstyle 行業更美好、更光明的未來。

”

VANESSA CHEUNG

張添琳

Founder of The Mills and Managing Director of Nan Fung Development Ltd.

南豐紗廠創辦人及南豐發展有限公司
董事總經理

The two winning projects were carefully hand-picked by Fabrica and Central Saint Martins based on their academic merit in material innovation and sustainability within the technology and lifestyle industry. “We are so pleased that The Mills Fabrica has again chosen to support our graduating students through The Mills Fabrica Techstyle and Sustainability Prizes... These awards signal our shared vision of a collaboration across the globe that innovates and pushes the boundaries of sustainability in the design sector.” said Rachel Dickson, the Dean of Academic Programmes at Central Saint Martins.

Rachel added, “opportunities like this are extremely significant to our students and not only do they provide financial reward and the opportunity to undertake a residency at The Mills Fabrica, they recognise their ambition, courage and creativity.” The two winners will be taking a three-month residency at Fabrica in Hong Kong to further develop their projects with access to our coworking space and Fabrica Lab, receive a cash prize and get connected to our network and community.

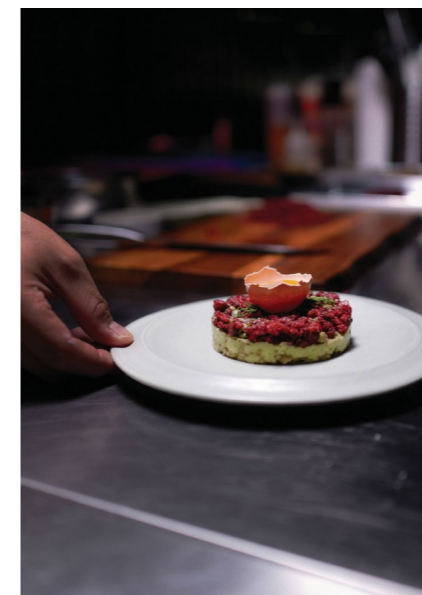
南豐作坊和 CSM 根據物料創新和可持續發展兩項學術成就，嚴謹挑選出今年度的獎項得主。CSM 的學術課程主管 Rachel Dickson 表示：「我們很高興南豐作坊再次透過『Techstyle 獎』和『可持續發展獎』支持我們的畢業生……這兩個獎項代表著我們的共同願景：藉全球合作推動設計界不斷創新和可持續發展。」

她補充：「這些機會對我們的學生來說非常重要，不單是財政上的支援和駐場計劃的機會，他們更認同了同學們的抱負、勇氣和創意。」兩名得獎者將會到香港南豐作坊進行為期 3 個月的駐場計劃，期間會使用南豐作坊內的共同工作空間和南豐作坊 Lab，繼續發展他們的項目。此外，兩名得獎者也會獲現金獎，更有機會認識南豐作坊的網絡與社群。

THE MILLS FABRICA TECHSTYLE PRIZE 南豐作坊 TECHSTYLE 大獎

A LIGHTER DELICACY BY SORAWUT KITTIBANTHORN (MA MATERIAL FUTURES)

未來物料 (MATERIAL FUTURES)
碩士課程畢業生
SORAWUT KITTIBANTHORN
「A LIGHTER DELICACY」



A LIGHTER DELICACY



@GUNNKITTIBANTHORN

Sorawut Kittibanthorn explained that over 2.3 million tons of feather waste were generated from poultry production alone in the EU every year, and usually, they will end up in landfills or incineration. However, since poultry feathers are perishable, they can cause hygienic issues in landfills or even contaminate the water system if they flow into rivers or farming fields.

Chicken feathers are composed of approximately 91% protein (keratin) which contains up to eight types of essential amino acids that we require as part of a healthy diet. Therefore, Sorawut's project proposes an alternative solution to recycling feather waste from slaughterhouses by converting its nutrient composition into a new edible product. You may wonder how the end product looks like – Sorawut said this project attempts to replicate the characteristics found in high-quality food, wiping out the stigma image that is associated with its original source.

“

With the help of The Mills Fabrica, my ambition is to build a community that would expand the trust and amplify the voice of the issue to get wider acceptance and present edible feathers as a viable means to introduce 'A Lighter Delicacy'. Developing my cross-disciplinary project in Hong Kong is also a great opportunity to meet The Mills Fabrica's industry partners who might inspire and give project contributions with their advanced technologies and expertise.

我希望借南豐作坊的支援達成我的抱負，建立一個提升信任和宣揚這個議題的平台，使更多人接受和利用可食用羽毛為切實可行的『新美食』。在香港研發這個跨領域項目，讓我有機會認識南豐作坊的行業夥伴，藉他們的先進科技和專門知識啟發這個項目的發展。

”

SORAWUT KITTIBANTHORN

MA Material Futures
未來物料 (Material Futures) 碩士課程畢業生



Sorawut Kittibanthorn 表示，光是歐盟的家禽養殖業，便每年產生 2.3 百萬噸廢棄羽毛，而它們多數會落入堆填區或焚化爐。可是，由於家禽的羽毛容易腐壞，在堆填區產生衛生問題，如果落入河流和田地，更有可能污染水系統。

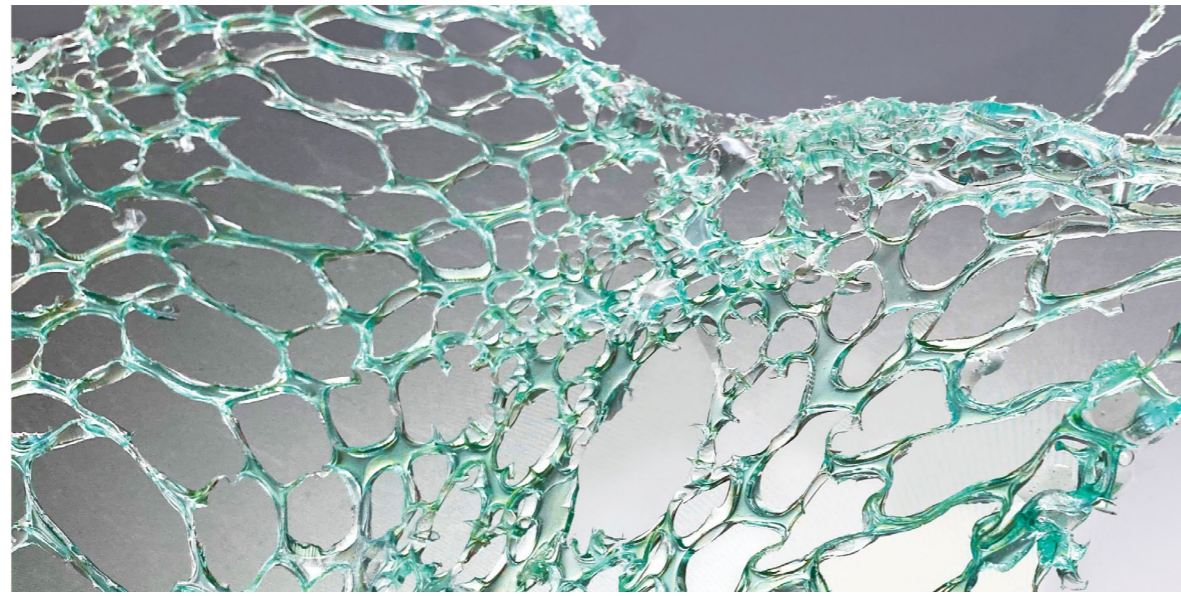
而事實上，雞的羽毛中有 91% 是蛋白質（角蛋白），當中更包含了 8 種健康飲食所需的胺基酸。因此，Sorawut 的替代方案建議從屠宰場回收雞羽毛，並轉化它們的營養成分轉化可使用產品。你可能會好奇最終成品長甚麼樣，Sorawut 則表示這個項目嘗試複製出高品質的食物元素，藉此抹去食物來源的負面形象。



THE MILLS FABRICA SUSTAINABILITY PRIZE 南豐作坊可持續發展大獎

SERPENTINE LACE BY SCARLETT YANG (BA WOMENSWEAR)

女裝設計 (WOMENSWEAR)
學士課程畢業生 SCARLETT YANG
「SERPENTINE LACE」



I am really glad to be receiving the prize and I hope to continue exploring my virtual/material design practice during the residency at The Mills Fabrica, to contribute to positive social changes in and beyond the fashion tech industry.

我很高興獲得這個獎項，並希望在南豐作坊駐場期間延續我對虛擬和物料設計的實踐，藉此在時裝科技行業內外推動正面的社會變革。



SCARLETT YANG

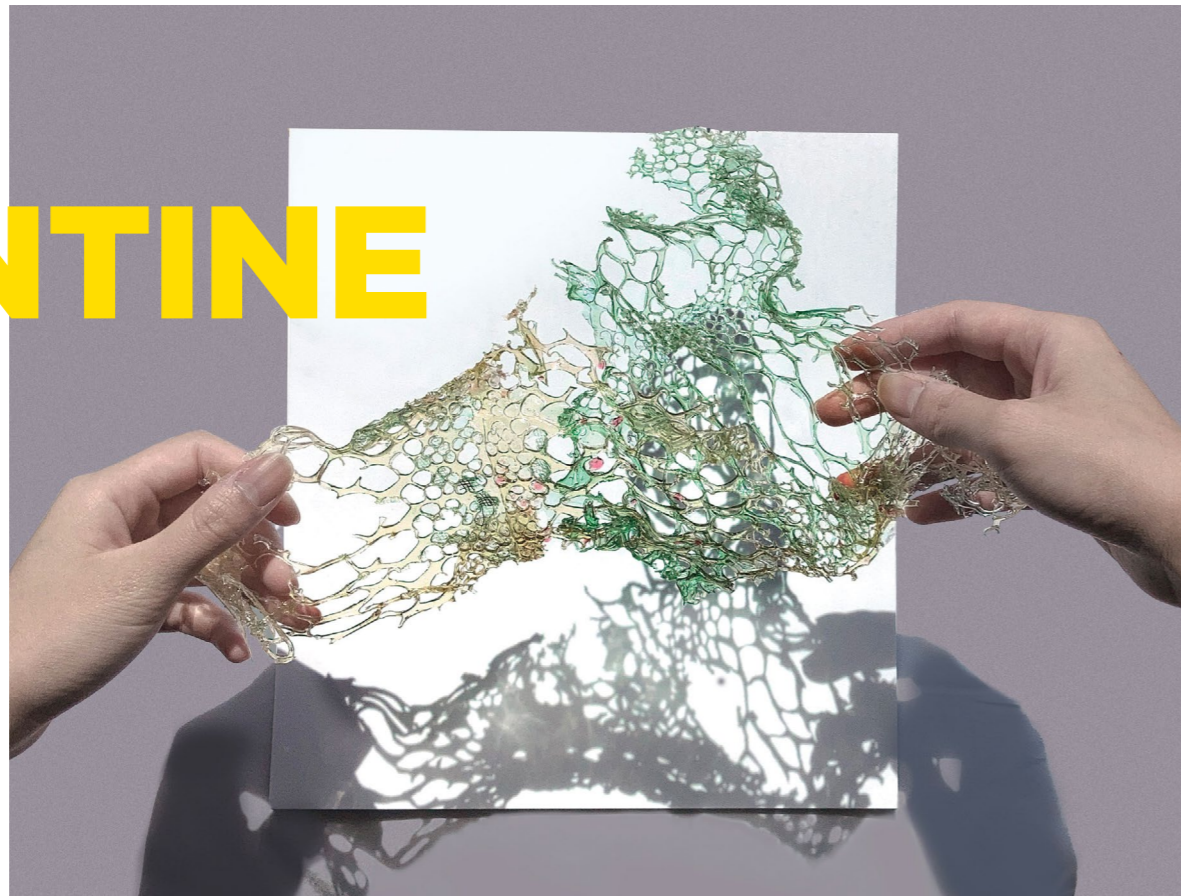
BA Womenswear
女裝設計 (Womenswear) 學士課程畢業生

Inspired by traditional Japanese techniques like Shibori tie-dye and Katazome stencil printing, Scarlett Yang has developed a biodegradable textile made with algae extracts and silk cocoon protein with 3D simulations on the decomposition process. Industrial silk producers seldom recycle or reuse the leftover silk cocoon, but Scarlett discovered in her research trip to traditional textile mills in Kyoto, Japan, that cocoon protein can be used to produce waterproof layers.

The collection describes a simulated circular living system, where clothing and styles grow, decompose and shape-change throughout time and changing environments. Within the narratives, fashion garments live and breathe like humans then evolve into its digital entity from its physical material body. Joining both bio-design and digital/generative technology together, the cross-disciplinary project speculates fashion textiles as a concept of designing lifecycles, suggesting a biodegradable and virtual solution for our current environmental emergencies.

啟發自傳統絞染 (Shibori) 和型染 (Katazome) 等日本工藝，Scarlett 利用海藻萃取物和蠶繭蛋白，以及 3D 模擬技術的模擬分解過程，研發出可生物降解的紡織品。絲綢工業甚少把殘餘的蠶繭蛋白循環再造和再用，而 Scarlett 在日本京都的研究之旅發現蠶繭蛋白能夠製成防水層。

而這個其系列描述一個模擬的可循環生態系統；其中，服裝和風格隨著時間和環境變遷不斷衍生、分解、改變形狀。透過這個敘事方式，時裝如人類般生存和呼吸，並且由有形實體進化成為數碼個體。這個跨領域的項目結合了生物設計和數碼化/衍生科技，推敲出時裝紡織作為設計週期的概念，並建議一個可生物降解和虛擬的方法回應當今的環境危機。



IN SEARCH OF WORLD-CHANGING INNOVATIONS: TECHSTYLE FOR SOCIAL GOOD INTERNATIONAL ONLINE COMPETITION 2020

尋找改變世界的創新方案：

TECHSTYLE FOR SOCIAL GOOD 國際網上比賽 2020



The competition invited a judging panel of renowned industry experts in the apparel/textiles and food tech fields, including Edwin Keh, CEO of The Hong Kong Research Institute of Textiles and Apparel, Elaine Siu, Managing Director of The Good Food Institute, Erik Bang, Innovation Lead of H&M Foundation, Dan Widmaier, CEO of Bolt Threads, Dr. Jeanne Tan, Associate Professor of Design at the Institute of Textiles & Clothing at The Hong Kong Polytechnic University, Peter Bodenheimer, Founder and Managing Director of Food-X, Philo Alto, Founder and CEO of Asia Value Advisors Limited, and Tracy Nilsson, Senior Director of Global Environmental Program at the adidas Group.

The judges assessed the projects based on 4 key criteria: creativity, sustainability, innovation and impact on society.

Co-organized with The Hong Kong Polytechnic University, the Techstyle for Social Good International Online Competition 2020 supports and celebrates techstyle (technology and lifestyle) innovations from students and graduates from around the world focusing on apparel/textile innovations and agri-food tech, encouraging young innovators to apply with their ideas and solutions that could make a positive impact on society for the greater good.

由南豐作坊與香港理工大學合辦的「Techstyle For Social Good 國際網上比賽 2020」，支持和表揚全球推動服裝/紡織創新及農業糧食科技的學生和應屆畢業生，研發突破性的 techstyle 創新（意指科技與生活時尚間的領域）。比賽鼓勵年輕創新者藉他們的構思和方案帶來正面影響，從而營造更美好的社會。

比賽邀請到多位服裝/紡織和糧食科技的專家擔任評判，當中包括：香港紡織及成衣研發中心行政總裁葛儀文、The Good Food Institute 董事總經理蕭凱怡、H&M Foundation 創新主管 Erik Bang、Bolt Threads 行政總裁 Dan Widmaier、香港理工大學紡織及製衣學系副教授陳芊瑞博士、Food-X 創辦人及董事總經理 Peter Bodenheimer、Asia Value Advisors Limited 創辦人及行政總裁 Philo Alto、以及 adidas 集團全球環境項目高級總監 Tracy Nilsson。

評審根據創意、可持續發展、創新和社會影響力 4 大準則評核各項目。

JUDGING CRITERIA

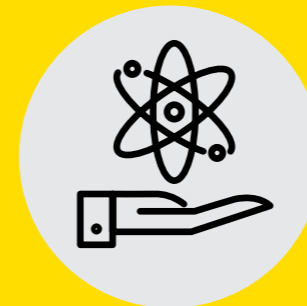
評審準則



CREATIVITY
創意



SUSTAINABILITY
可持續發展



INNOVATION
創新



IMPACT ON SOCIETY
社會影響力

COMPETITION CATEGORIES

比賽組別



APPAREL/TEXTILES
服裝 / 紡織



AGRI-FOOD TECH
農業糧食科技



NEW MATERIALS
& SUPPLY CHAIN
INNOVATION
新興物料及供應鏈創新



AGTECH
農業科技



WEARABLES &
PRODUCTS MERGING
TECHNOLOGY &
DESIGN
可穿戴科技及
揉合科技與設計的產品



FOOD TECH
糧食科技



NEW RETAIL
EXPERIENCES
新零售體驗

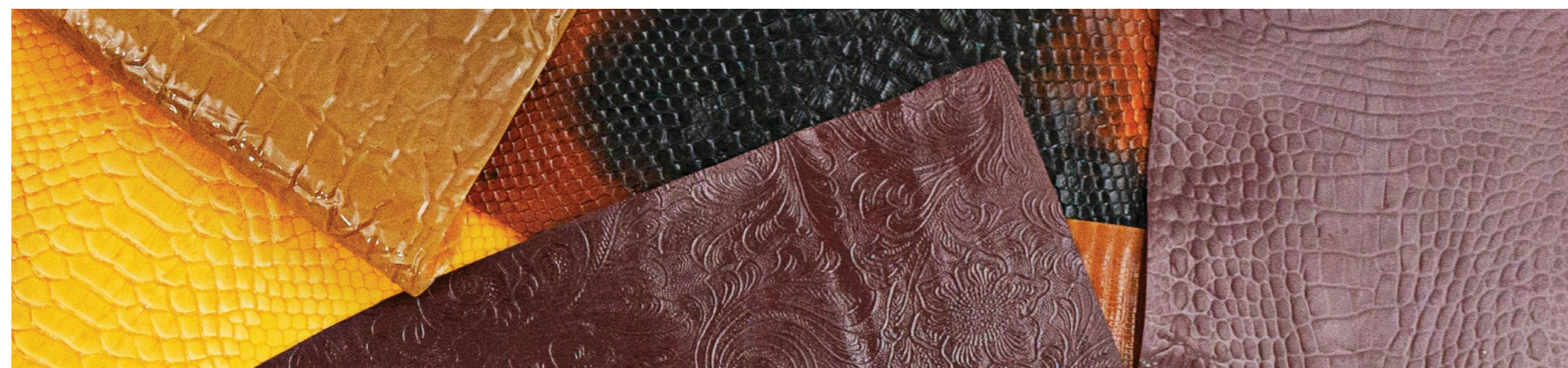


FOOD RETAIL
INNOVATION
食品零售創新

SERPENTINE LACE



@SCARLETTYANG_



TECHSTYLE GRAND PRIZE

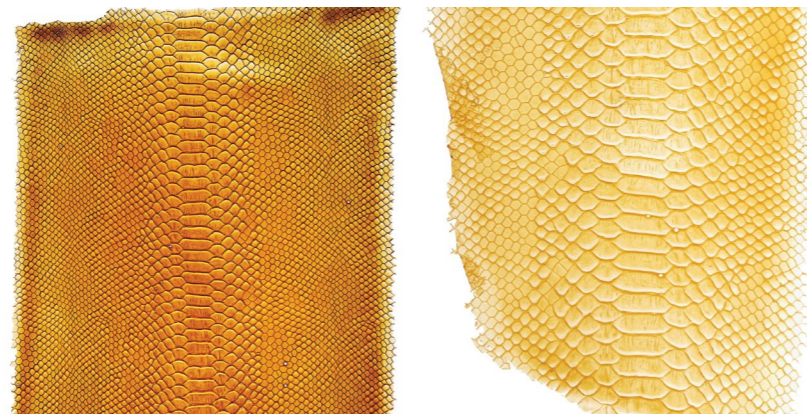
TÔMTEX



TECHSTYLE GRAND PRIZE

TECHSTYLE 大獎

WINNER
得主 **Uyen Tran**
(Parsons School of Design of The New School/
新學院大學帕森斯設計學院)



The designer said humankind generates 300 million tons of plastic waste every year, and only 9% of them are recycled, while the rest are incinerated or landfilled, jeopardizing the natural environment. Alongside packaging and plastic bottles, faux leather, which is made from PVC, also greatly contributes to plastic pollution. Therefore, Uyen developed Tômtex, a leather-like biomaterial, to mitigate the plastic pollution. Made of discarded seafood shells and coffee grounds, grounds as feedstock, the material is 100% biodegradable. Meanwhile, its carbon footprint and water consumption are approximately 10 times less than faux leather, providing a highly sustainable and resource-efficient alternative for the garment industry.

設計師表示人類每年產生3億的塑膠廢物，但當中只有9%被循環再造，而其餘的都被焚化或堆填，嚴重危害自然環境。而除了包裝物料和塑料瓶，以聚氯乙烯（PVC）為原料的仿皮也是塑膠污染的元兇之一。因此，Uyen 希望透過研發生物物料「Tômtex」減少仿皮帶來的污染。這模仿皮革材質的可降解物料，以海鮮甲殼和咖啡渣為原料，比起生產仿皮的碳排放量少約10倍，為行業提供可持續、具資源效益的替代方案。

TOMTEX.CO

TECHSTYLE SPECIAL PRIZES & COMMUNITY PRIZE

MITT BY KOALAA



TECHSTYLE SPECIAL PRIZE IN APPAREL/TEXTILES

TECHSTYLE 服裝及紡織特別獎

WINNER
得主 **Nate Macabug,
Gino La and Sanish Mistry**
(Imperial College London/倫敦帝國學院);
Elena Slobodyuk
(Loughborough University/羅浮堡大學)



Because 90% of disabled people do not have access to affordable prosthetics, the Mitt team has designed a personalized prosthetic arm for the disabled community. By bringing a lightweight sleeve and a customized prosthetic hand together with a magnetic dock, it empowers users to complete everyday tasks ranging from eating, brushing teeth to gardening. In addition, the product comes in different sizes, fitting users of all ages with different elbow shapes.

90%的殘疾人士並沒有渠道購買價格相宜的義肢，正因如此，Mitt 團隊為殘疾社群設計了一款個人化的手臂義肢。他們利用磁鎖連接輕巧的袖子和義肢，方便使用者進食、刷牙甚至打理花園等日常事務。此外，產品提供多個尺寸，適合不同年齡、擁有不同手肘形狀的用戶。

YOURKOALAA.COM

AQUATECH

IMMORTALITY INDOOR ECO
AQUACULTURE SYSTEM
室內永生生態養殖系統



TECHSTYLE SPECIAL PRIZE IN FOOD TECH

TECHSTYLE 糧食科技特別獎

WINNER
得主 **Sunny Lee** (Lingnan University/嶺南大學),
Ka Wai Chum (The Chinese University of
Hong Kong/香港中文大學),
Hin Hang Sin (South China University of
Technology/華南理工大學),
Shing Chiu Law (Hong Kong Institute of
Vocational Education/香港專業教育學院)



"Immortality Indoor ECO Aquaculture System" is an indoor close-looped aquaponic eco-system producing low-polluting indoor sustainable aquatic products, fruits and herbs. With a mission of supporting local underprivileged communities, the team hires retired fishermen and lower-income communities to manage the system, empowering industry veterans to apply their expertise to this innovative social venture.

「室內永生生態養殖系統」是一個室內閉環的水生生態系統，生產低污染的室內可持續水生生產、水果和草本植物。他們的願景是支援本地貧窮社群，因此，他們聘用退休漁民和低收入群體管理系統，讓富經驗的漁業人士在這創新社企事業中一展所長。

IXON

ADVANCED SOUS-VIDE
ASEPTIC PACKAGING
高級慢煮無菌包裝



TECHSTYLE COMMUNITY PRIZE

TECHSTYLE 社群大獎

WINNER
得主 **Felix Cheung and Elton Ho**
(Hong Kong Baptist University/
香港浸會大學);
Keith Tong (City University of
Hong Kong/香港城市大學)



Advanced sous-vide aseptic packaging (ASAP) enables food sterilization at relatively low temperatures between 60 to 80 degrees. Fresh meat can be made sterile and stored at room temperatures for up to two years. The solution can reduce the carbon footprint from cold-chain transportation and prevent perishable goods from spoiling.

Advanced sous-vide aseptic packaging (高級慢煮無菌包裝，簡稱 ASAP) 讓食物在相對較低的溫度（攝氏 60-80 度）進行消毒。新鮮肉類被製成無菌產品後，能於室溫放置長達兩年。他們的方案不僅可以減少冷凍運輸帶來的的碳足跡，也可以避免容易腐爛的食品變壞。

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“I AM DEEPLY HONORED TO BE THE WINNER OF THE TECHSTYLE GRAND PRIZE THIS YEAR. THIS AWARD NOT ONLY PROVIDES CRITICAL FUNDING FOR MY RESEARCH, BUT ALSO PROVIDES KEY SUPPORT FOR MY FUTURE CAREER. I AM VERY EXCITED TO SEE WHAT THE FUTURE HOLDS FOR TÔMTEX.”

「我很榮幸成為今年 TECHSTYLE 大獎的得主，這不僅為我的研發工作提供關鍵資金，也為我未來的事業生涯提供重要的支援。我對 TÔMTEX 的未來充滿期待。」



南豐紗廠

ABOUT THE MILLS

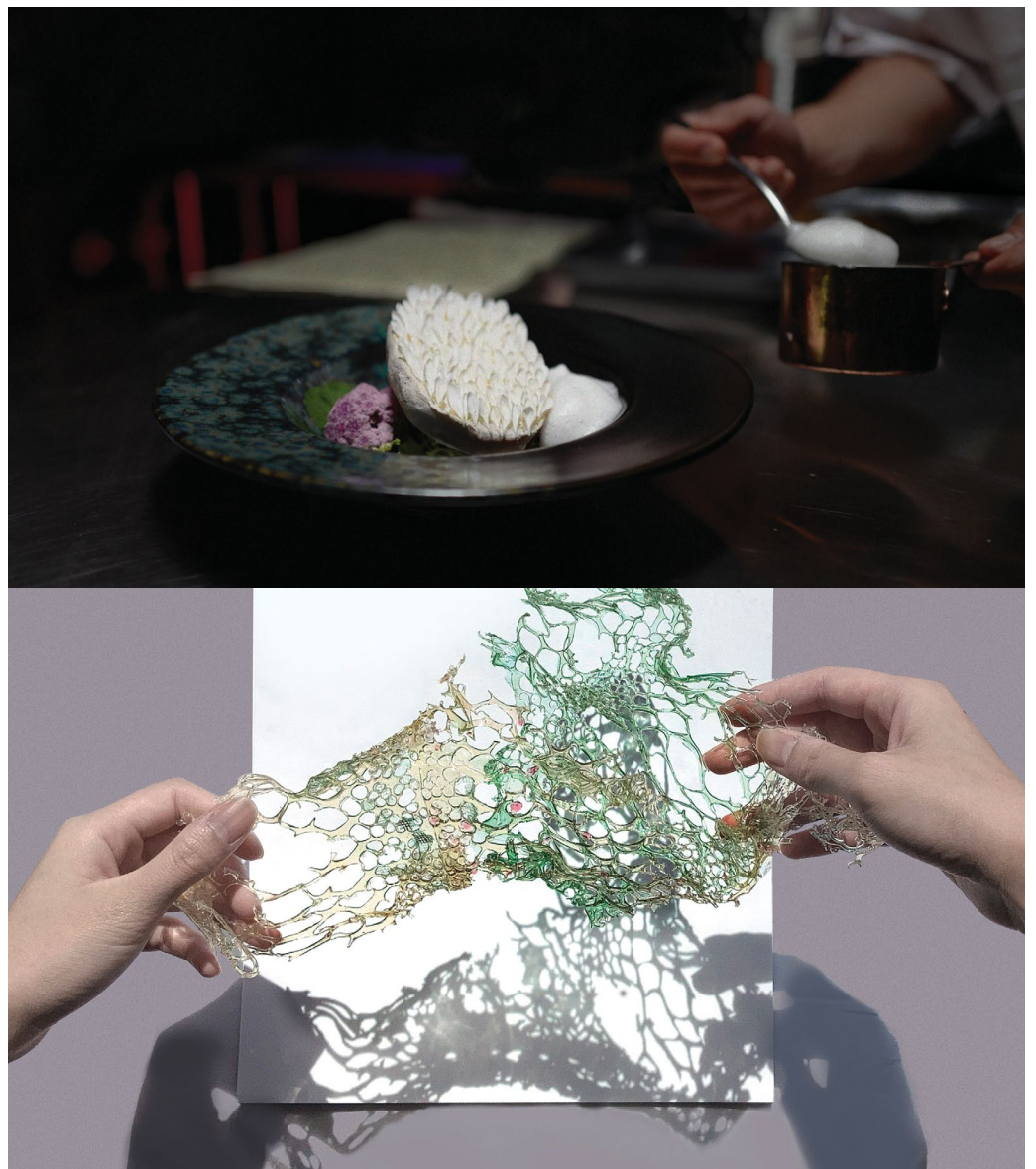
The Mills is a landmark revitalization project from Nan Fung Group, a celebration of shared industrial legacy with Hong Kong, and a step towards a future of applied creativity and innovation.

The Mills is composed of 3 main pillars: Fabrica, Shopfloor and the Centre for Heritage, Arts and Textile (CHAT). Building on a foundation of legacy and heritage, visitors can explore the continuity of an authentic Hong Kong story, where themes of textile and industry are woven into experiences of innovation, culture, and learning.

關於南豐紗廠

南豐紗廠是南豐集團策劃的地標式保育項目，見證香港紡織工業的承傳，並帶領本地應用創意及創新產業邁進新里程。

南豐紗廠由南豐作坊、南豐店堂及六廠紡織文化藝術館三大支柱組成。項目建基於集團的承傳與歷史，並以紡織和工業為根基，交織出創新、文化及學習體驗，讓訪客從中探索不斷延續而真實的香港故事。



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