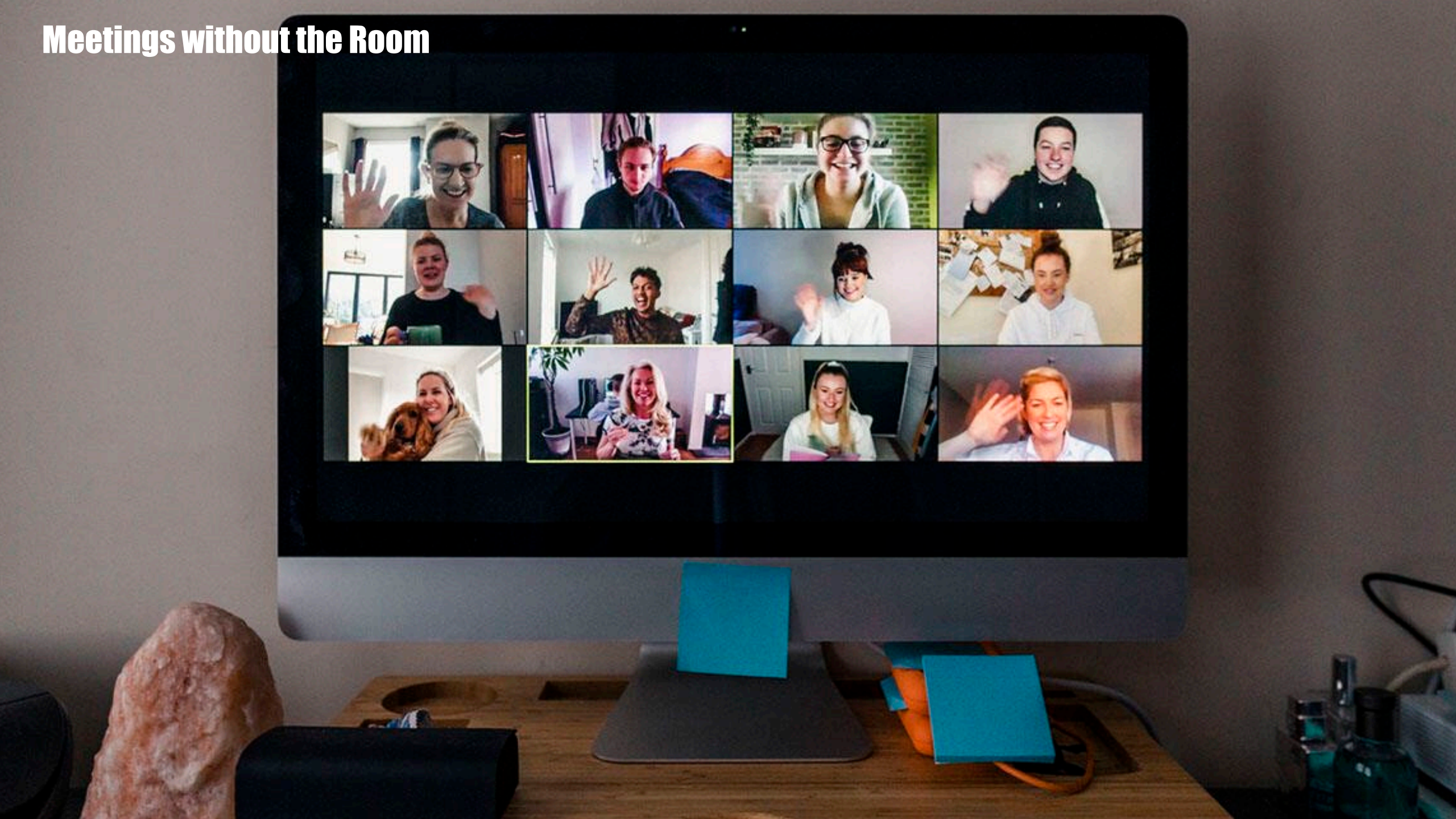
TRANSFORMATION IN THE BIOECONOMY

The changes we'll see, the opportunities we'll create

Amazing innovation can happen anywhere,
because it's happening everywhere.

Coins without a Country

Meetings without the Room



DNA without the Body

The Onyx Digital Genome Engineering Instrument automates all aspects of large-scale, massively parallel genome engineering experiments — including the cell transformation, CRISPR-based genome engineering, cell growth, and cell recovery — all at your benchtop, all push-button easy. The instrument automatically reads the consumables' barcodes and downloads the corresponding protocol ensuring every instrument run is set up for success. Single benchtop system performs every step of the engineering process while providing real-time monitoring. It supports a CRISPR-edited cell library with thousands of programmed edits generated in 2 – 4 days.

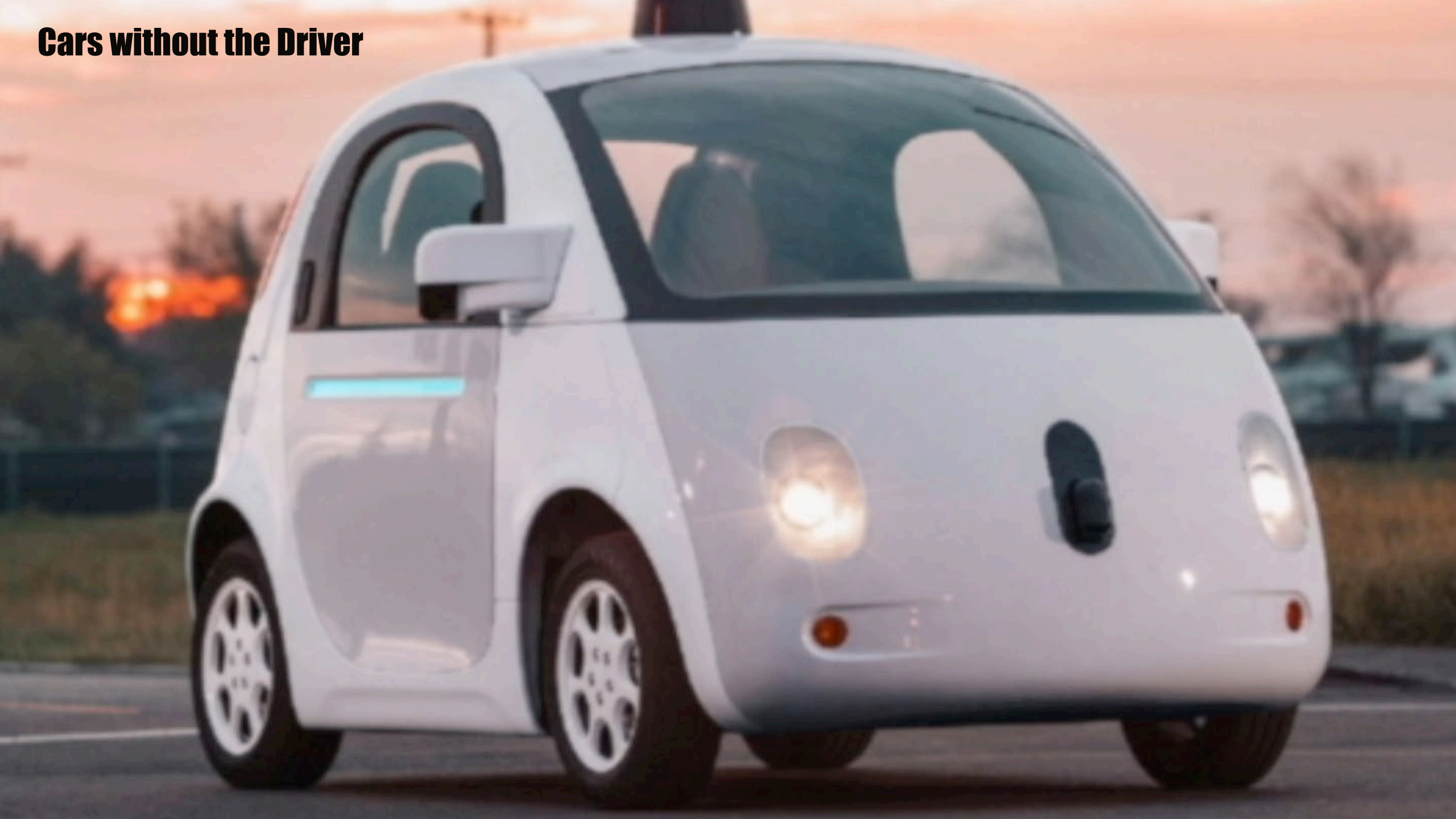
Stores without the Check-out

Rides without the Taxi

TV without the Cord

Sweetener without the Sugar

Cars without the Driver



MADE FROM
ALGAE!

MADE FROM
SPIDER SILK!

MADE FROM PLANTS!

MILK WITHOUT
THE COW!

LEATHER
WITHOUT
THE COW!

Sushi without the Fish

Honey without the bees

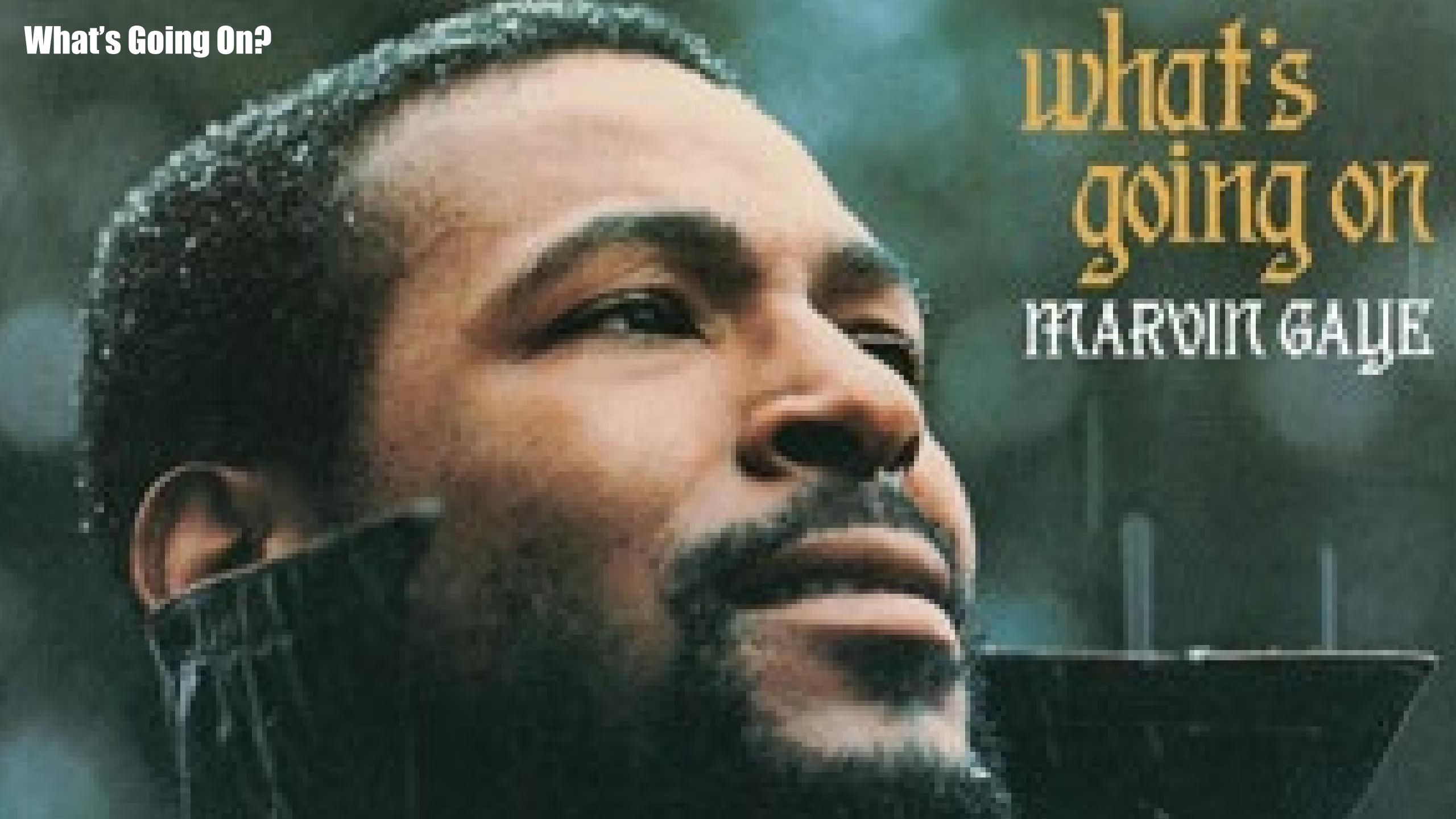
Synthetic biology company MeliBio has held a private tasting event for what it claims to be the world's first bee-free honey.

The Berkeley-based company produces honey molecularly identical to the yummy vomit generated by bees. Green Queen's Alessandra Franco, who was among the lucky few to score a sample, said MeliBio's product "tastes, drips and spreads 100% like honey made from bees."

Melibio was founded in 2020 and aims to begin shipping by the end of year. It is currently welcoming foodservice orders. Investors include Big Idea Ventures, Joyance and Sustainable Food Ventures.

"Honey is an ingredient found in every product category, from food to beverage and personal care products for which MeliBio is now providing a plant-based option," says co-founder and CEO Darko Mandich. "By bringing delicious, nutritious, and real honey made without bees to the market, we are shaping our present and future in a way that is better for bees and for humans."

What's Going On?



5 REVOLUTIONS CONVERGING

Genetics

Robotics

Bandwidth

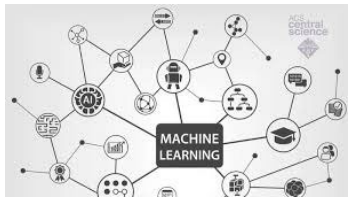
Intelligence

Storage

mRNA vaccine gene edits

Advanced Warehousing

Augmented Reality



Machine learning

DNA data storage

A dizzying array of companies and institutes


And $20 trillion in ESG funds

BMW without the metals

Luxury automaker BMW has said renewable materials will play a large role in its plans to cut its carbon footprint by 2030.

BMW is working with startup Adriano di Marti S.A. de C.V. on cactus-based material Deserttex, which is comprised of pulverized cactus fibers with a biobased polyurethane matrix. BMW has also made an equity investment in the plant-based material startup Natural Fiber Welding.

The company says it will focus R&D on “environmentally-compatible raw materials” and will work with both startups and established suppliers to develop “pioneering” materials.

“We are setting new standards for sustainable premium quality – by rethinking materials and focusing more than ever on resource-efficient alternatives and renewable materials with strong dismantling capability,” says Stefan Floeck, head of Development Body, Exterior, Interior.

The company already uses renewable raw materials like cellulose, hemp, wood and bamboo, but plans to evaluate wood foams to replace acoustic foams as well as alternative leathers.

Burgers without the Meat

Chanel without the Plastics

iconic fragrance brand Chanel has launched plant-based, biodegradable caps for its perfume bottles.

Finding a material capable of meeting such specific performance criteria is “a message to other industries that sustainable plastic alternatives can meet the most rigorous standards,” Suvi Haimi, CEO of Sulapac, tells Global Cosmetics News. “The big revolution is that you no longer need to use plastic.”

Following two years of research and nearly 50 prototypes, Chanel settled on material made by Sulapac, a Finnish producer of plant-based plastic. Criteria included sound when cap is fastened, and the “depth of the satiny matte finish on the iconic double C engraving.”

The caps are 91% biobased. Chanel will use the material on all of its 125 mL Les Euax de Chanel fragrances.

Crocs without the Carbon

The Free Pair for Healthcare program donated another 860,000 pairs of shoes to frontline healthcare workers in 2020.

Old Navy without the Rubber

he ubiquitous, no-frills Old Navy summer flip-flop is getting a renewable makeover thanks to EVA foam made from sugarcane.

On sale now for $4.99-$8.99, the flops are available in four styles—classic, T-strap, Jelly Criss-Cross and Jelly Slide. All feature an EVA outsole that is 51% sugarcane-based.

The new offering from Old Navy is just the latest in a line of new products based on renewable materials that span all price points. Walmart recently launched bras made from sugarcane-based materials, while high-end brands Gucci and Alexander McQueen are working with Bolt Threads on luxury goods made from mushrooms.

In April, Old Navy announced the elimination of plastic shopping bags in the U.S. and Canada stores by 2023, alongside other plastic reduction commitments aimed at creating a greener, cleaner future for the next generation. The brand will also invest in a new wave of earth-minded changemakers in honor of the 51st anniversary of Earth Day. In partnership with 11-year-old Next Gen leader Ryan Hickman of Ryan's Recycling Company, Old Navy will fund 51 GoFundMe fundraisers from young advocates leading environmental progress in their communities.

"These flip-flops are partially made from renewable sugarcane, which helps cut down on our consumption of fossil fuels," Old Navy says. "It looks and feels just like your favorite flip-flops, while helping reduce our carbon footprint."

Adidas without the Crude Oil

This Stan Smith FOREVER branded shoe featuring a PRIMAGREEN upper made with 80 percent recycled material.

“Plastic is a design failure disguised as an incredible material. It is cheap and strong, and it can be turned into a thousand different forms,” says the company. “These characteristics are what make plastic so attractive to manufacturers and consumers alike. They are also what make plastic one of the most ubiquitous pollutants on our planet.

Parley For The Oceans was formed to bring together people, organizations, and brands to find new answers to today’s major ocean threats, like plastic pollution. Adidas was a founding member of the organization.

Primeblue is a high-performance recycled material made in part with Parley Ocean Plastic—upcycled plastic waste intercepted from remote islands, beaches, coastal communities, and shorelines, preventing it from polluting our oceans.

Recycling? Plastic waste is collected and baled by Parley’s global cleanup network The plastic is cleaned, stripped, and manually sorted, then flaked via crushing, washing, and dehydrating.The flakes are heated, screened, cleaned, and dried before being extruded, cooled, and chopped into resin pellets. The pellets are melted into a filament that can be spun into Ocean Plastic, a high-performance polyester yarn with all the qualities you’d get from virgin plastic.

The ADIDAS RUN FOR THE OCEANS event aims to clean up to 500,000 pounds of plastic waste to prevent it from entering our oceans. “We came a long way and we won't stop here,” the company avers.

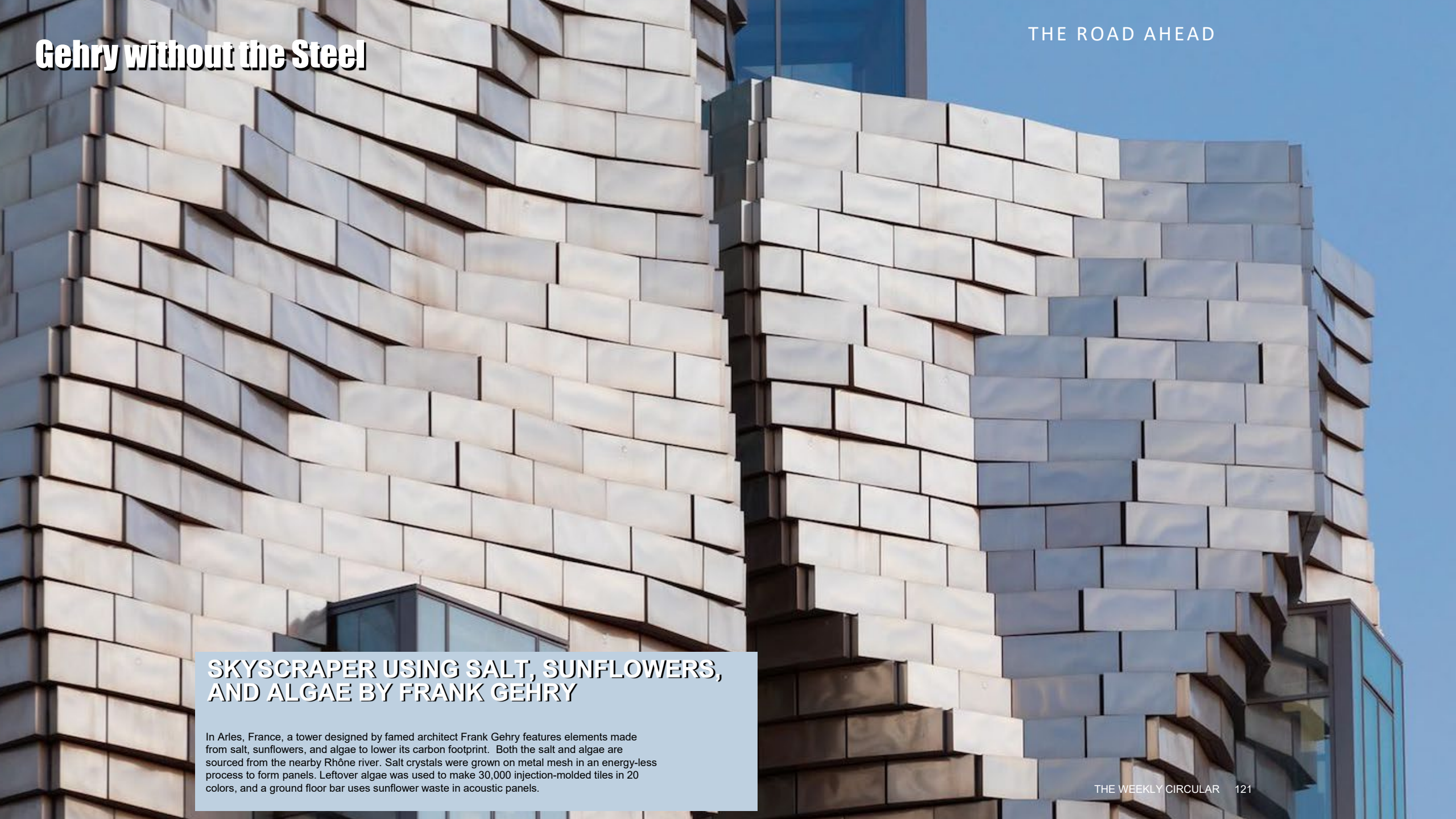
Adidas sez: “As we continue to address our overall carbon footprint, we’re shifting to use 100% recycled polyester in our products by 2024. This is bigger than sport, this is fo our future.”

Airbus without the Jets

Airbus aims to develop the world's first zero-emission commercial aircraft by 2035. Hydrogen propulsion will help deliver on this ambition, they say.

The ZEROe concept aircraft seen here, enables the exploration of a variety of configurations and hydrogen technologies that will shape the development of future zero-emission aircraft.

Gehry without the Steel



SKYSCRAPER USING SALT, SUNFLOWERS, AND ALGAE BY FRANK GEHRY

In Arles, France, a tower designed by famed architect Frank Gehry features elements made from salt, sunflowers, and algae to lower its carbon footprint. Both the salt and algae are sourced from the nearby Rhône river. Salt crystals were grown on metal mesh in an energy-less process to form panels. Leftover algae was used to make 30,000 injection-molded tiles in 20 colors, and a ground floor bar uses sunflower waste in acoustic panels.

5 TRENDS EMERGING

COMMUNICATIONS

MATERIALS

AGRICULTURE

DATA

ENERGY

AGRICULTURE

IBSF03 2016

Ardra Bio

Sythetic biology to create natural flavors, fragrances and ingredients for food and cosmetics. Lower costs and more sustainabie.

HQ: United States

Industrial | Pre-Seed | Climate 100 | Impact | San Francisco

AGRICULTURE

IBSF07 2018

NovoNutrients

NovoNutrients converts CO2 emissions to create high-value, low-cost proteins for aquaculture and beyond.

HQ: United States

Industrial | Seed | Climate 100 | Impact | San Francisco

MATERIALS

IBSF06 2018

Lingrove

Hardwood-replacements that are 7x stronger than steel and lighter than carbon fiber.

HQ: United States

Consumer | Industrial | Pre-Seed | Climate 100 | Impact | San Francisco

IBSF12 2021

Pyrone Systems

AGRICULTURE

Pesticides are always a compromise: if you kill the mosquitos, you end up killing the bees too. Pyrone discovered a rare natural compound that controls mosquitos and other pests not by killing them, but by temporarily stunning them. Already fast-tracked by the EPA and being tested by the USDA in Gainesville, Pyrone is now scaling [...]

HQ: United States

Ag | Industrial | Pre-Seed | Sustainable Solutions | San Francisco

IBSF13 2022

Infinite Elements

MATERIALS

Reducing our vulnerability to disruptions in our supply of critical metals is important for national security, but the current methods used to mine and extract metals are too toxic, too energy intensive, and damage communities and the environment around the world. Infinite Elements is using synthetic biology to extract, concentrate, and purify rare earth metals [...]

HQ: United States

Industrial | Pre-Seed | Female Founder | New Frontiers

IBSF13 2022

Gozen Bioworks

MATERIALS

Founded by one of Turkey's most famous young fashion designers, Gozen Bioworks is a biomaterials company that has created the world's strongest and softest bio-based animal-free leather to date. Their latest product (Xylozen™) is twice as strong as animal leather, impossibly thin, and soft enough to replace lambskin in luxury tiers. The breakthrough in their [...]

HQ: Turkey

Consumer | Fermentation | Pre-Seed | Climate 100 | Female Founder | Sustainable Solutions | Turkey

IBSF03 2016

Joywell Foods

Joywell Foods makes protein sweeteners that are sweeter than sugar, without the calories.

HQ: United States

Food | Industrial | Series A | Climate 100 | Female Founder | San Francisco

AGRICULTURE

IBSF04 2016

Catalog Technologies

The world's leader in using DNA for high-density data storage and computation.

HQ: United States

ClimateTech | Industrial | Series A | Climate 100 | Boston

COMMUNICATIONS

IBSF04 2016

Calyx

Calyx makes advanced bio-sensors that are highly specific, sensitive, and durable. Their first use case is poultry, where their Ammonia sensor is being deployed with some of the largest producers in the world.

HQ: United States

Ag | Industrial | Series A | San Francisco

COMMUNICATIONS

IBSF13 2022

MAA'VA

Concrete is the third largest greenhouse gas emitter but even less known is how much sand is required to make it. Sand mining is responsible for ecosystem collapse through erosion, water outflows, and biodiversity loss. The shortage of sand has prompted researchers to replace it with more sustainable aggregates, but the previously unsolvable issue is [...]

HQ: United States

Industrial | Pre-Seed | Climate 100 | Female Founder

MATERIALS

IBSF13 2022

Nitrofix

In order to supply our agriculture and industries with an available source of nitrogen, we rely on a chemical process that requires 400°C of heat and more pressure than at the bottom of the world's deepest lake. It's no wonder that ammonia production releases 500 million tons of CO2 annually (3% of the world's carbon [...]

HQ: Israel

ClimateTech | Industrial | Pre-Seed | Climate 100 | Female Founder

AGRICULTURE

IBSF05 2017

NotCo

Plant-based meat and dairy products, powered by AI

HQ: United States

Food | Series B+ | Climate 100 | Future of Food | San Francisco

AGRICULTURE

IBSF01 2015

Endless West

Spirits and wines made from natural molecules.

HQ: United States

Food | Industrial | Series B+ | Climate 100 | Future of Food | San Francisco

AGRICULTURE

IBSF02 2015

Geltor

Animal-free collagen for beauty, food, and beverage products.

HQ: United States

Food | Industrial | Series B+ | Future of Food | San Francisco

AGRICULTURE

IBSF05 2017

Finless Foods

Cellular agriculture to produce seafood, with a focus on bluefin tuna

HQ: United States

Food | Series A | Climate 100 | Future of Food | San Francisco

AGRICULTURE

IBSF06 2018

Prime Roots

Deli and groceraunt meals using fungi proteins.

HQ: United States

Food | Series A | Climate 100 | Female Founder | Future of Food | San Francisco

AGRICULTURE

IBSF02 2015

NewWave Foods Inc.

Delicious plant based shrimp

HQ: United States

Food | Series A | Climate 100 | Female Founder | Future of Food

AGRICULTURE

MATERIALS

FLO. materials

INFINITELY RECYCLABLE POLYMERS, ENABLING CIRCULAR DESIGN

FLO Materials is commercializing a new polymer platform (PDKs) that enables recyclability for products that are currently challenging to recycle. PDKs are crosslinked polymers that can be mechanically reprocessed like thermoplastics due to their dynamic nature and chemically recycled to regain their original monomers. Spun out from Lawrence Berkeley National Laboratory, FLO Materials will bring to market an infinitely recyclable network of polymers to enable sustainable manufacturing, increase materials efficiency, and facilitate the transition to a more circular plastics economy.

COMMUNICATIONS

Ọsọ Semiconductor is an innovative fabless semiconductor company selling ultralow-power, low-cost, performance microchips to supercharge the antennas of the future. Its patentable ultra-low loss beamformer, featuring a Combiner-First™ architecture, provides massive power and cost savings for antenna manufacturers.

ENERGY

INLYTE ENERGY

AFFORDABLE GRID BATTERIES FROM IRON AND SALT

Inlyte Energy seeks to develop a battery based on two extremely low-cost abundant materials: iron and table salt. The chemistry has the potential to meet all the technical requirements for affordable and secure grid storage, which is crucial for continuing the swift growth of clean wind and solar power globally.

COMMUNICATIONS

SEMIOTIC LABS

NEGOTIATIONS AUTOMATED

Semiotic Labs is building a secure protocol to automate negotiations for decentralized markets. Its technology, based on hardware-accelerated cryptography and AI, provides privacy protections as well as intelligent decision-making. It opens new applications for blockchain technology, where eliminating central authorities and intermediaries increases operational efficiency and reduces costs, particularly in high-security applications.

MATERIALS

TRULY COMPOSTABLE PLASTIC FOR A CIRCULAR BIOECONOMY

Intropic Materials is unlocking a new bio-active products market with its enzyme stabilizing technology. By embedding degrading enzymes directly inside plastics, Intropic is imparting a favorable end-of-life at the beginning. Once activated, the enzymes trigger the plastic to rapidly and completely self-degrade into biodegradable or chemically recyclable small molecules.

ENERGY

REVOLUTIONIZING ELECTRONICS WITH FLEXIBLE BATTERIES

Anthro Energy is changing the shape of energy storage. Its highly robust polymer electrolyte easily integrates into existing battery manufacturing facilities and enables flexibility and safety while maintaining excellent performance. Ultimately, Anthro technology will enable structural batteries that can be integrated into the design of any electrical system.


METAseismic
Creating sustainable
METAMATERIALS
for dampening impacts and vibrations

COMMUNICATIONS

MATERIALS

Zymochem

Lignocellulose to biopolymers with microbes

INVESTOR INQUIRIES

ClimateTech | Fermentation | Series A | Climate 100 | Sustainable Solutions | San Francisco

Founded
2016

Funding to Date*
$18M

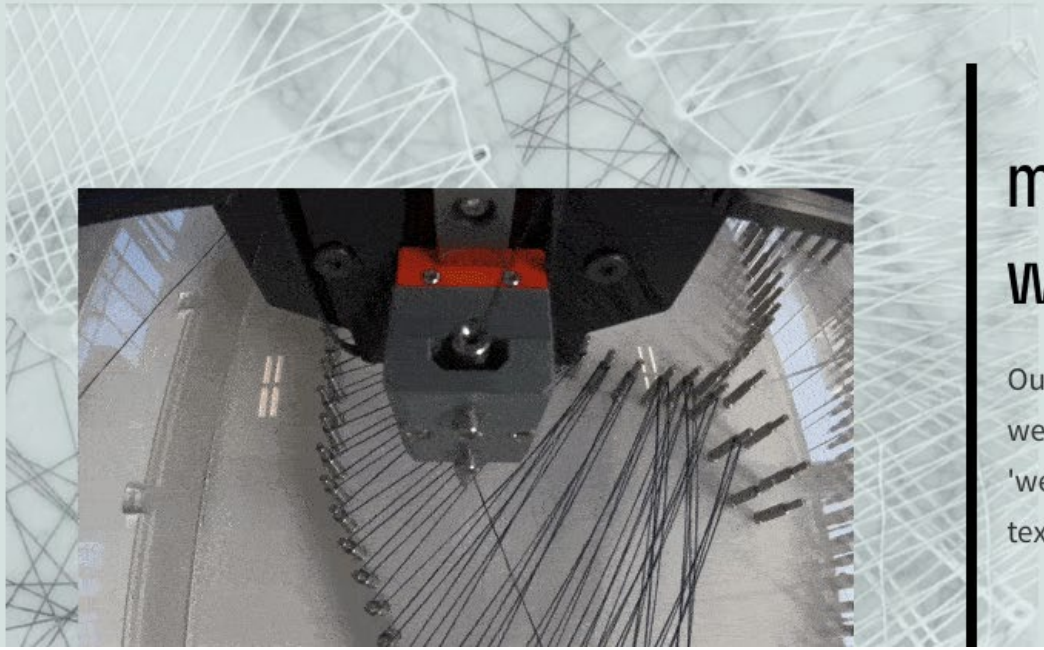
Website
www.zymochem.com/

* Data source: Crunchbase

A baby will use up to 4500 diapers in their first year, and none of them are biodegradable

Some of the refined products from petroleum are chemicals that make it into our modern world as polymers (imagine plastics), but the degradability of these polymers are well documented. One such synthetic polymer are super absorbent polymers (SAP). The global market of SAPs alone is $9 billion, for use in disposable personal hygiene products like diapers.

Zymochem is making bio-SAP from lignocellulosic feedstock in a fully integrated process. This starts with de novo microbe design to make inherently scalable microbial catalysts, equipped with non-novel enzymatic chemistries. These biosynthetic microbes are designed to produce from renewable feedstock in high yields, and with little or no use of oxygen.



microbial weaving

Our patent pending microbial weaving process uses bacteria to 'weave' customizable bio-textiles and composites.

growing the future

Taking notes from nature to explore how biomaterials and emerging biofabrication technologies could influence the products we use everyday

What is 4D Printing?

4D printing is the process through which **a 3D printed object transforms itself into another structure** over the influence of external energy input as temperature, light or other environmental stimuli.

This technology is part of the project of MIT Self-assembly Lab. The purpose of this project is to combine technology and design to invent self-assembly and programmable material technologies aiming at reimagining construction, manufacturing, product assembly, and performance.

In the video above, we see a flat-printed structure that, once placed in hot water, slowly folds itself into another structure. The video below is a test from MIT Selfassembly laboratory demonstrating the functionality of shape transformation: 4D Printing: Self-Folding Surface Cube from MIT Self-Assembly Lab

4D Printing: Self-Folding Surface Cube from MIT Self-Assembly Lab

Lahgo's long sleeve Restore henley features Celliant® infrared technology made from naturally occurring thermoreactive minerals that help regulate body temperature, resulting in more comfortable rest. Photo: Hologenix.

Edible drones could improve delivery of life-saving supplies

An engineering project at the Swiss Federal Institute of Technology in Lausanne is envisioning edible drones as a means to increase the payload of life-saving emergency provisions.

According to the Institute of Mechanical Engineers, drone cargo is currently limited to 10–30% of overall mass—meaning drone drops of food to the stranded can be pretty inefficient. Efficiency is particularly important when multiple deliveries are needed, as can be the case with natural disasters.

The Swiss team suggests that delivering the goods in something edible, instead of conventional packaging materials, could help deliver additional calories or make room for other survival supplies. "We used rice cookies, which can be found from any grocery store, and we glued each cookie with edible gelatine material," researcher Bokeon Kwak tells IME. "The density of the rice cookie is almost comparable to a widely used engineering material," that is "typically super-lightweight" but sturdy enough for flight, he adds. The prototype provides an additional 300 calories, although use of gelatine is not vegetarian. Kwak hopes to develop a completely edible prototype within four years.

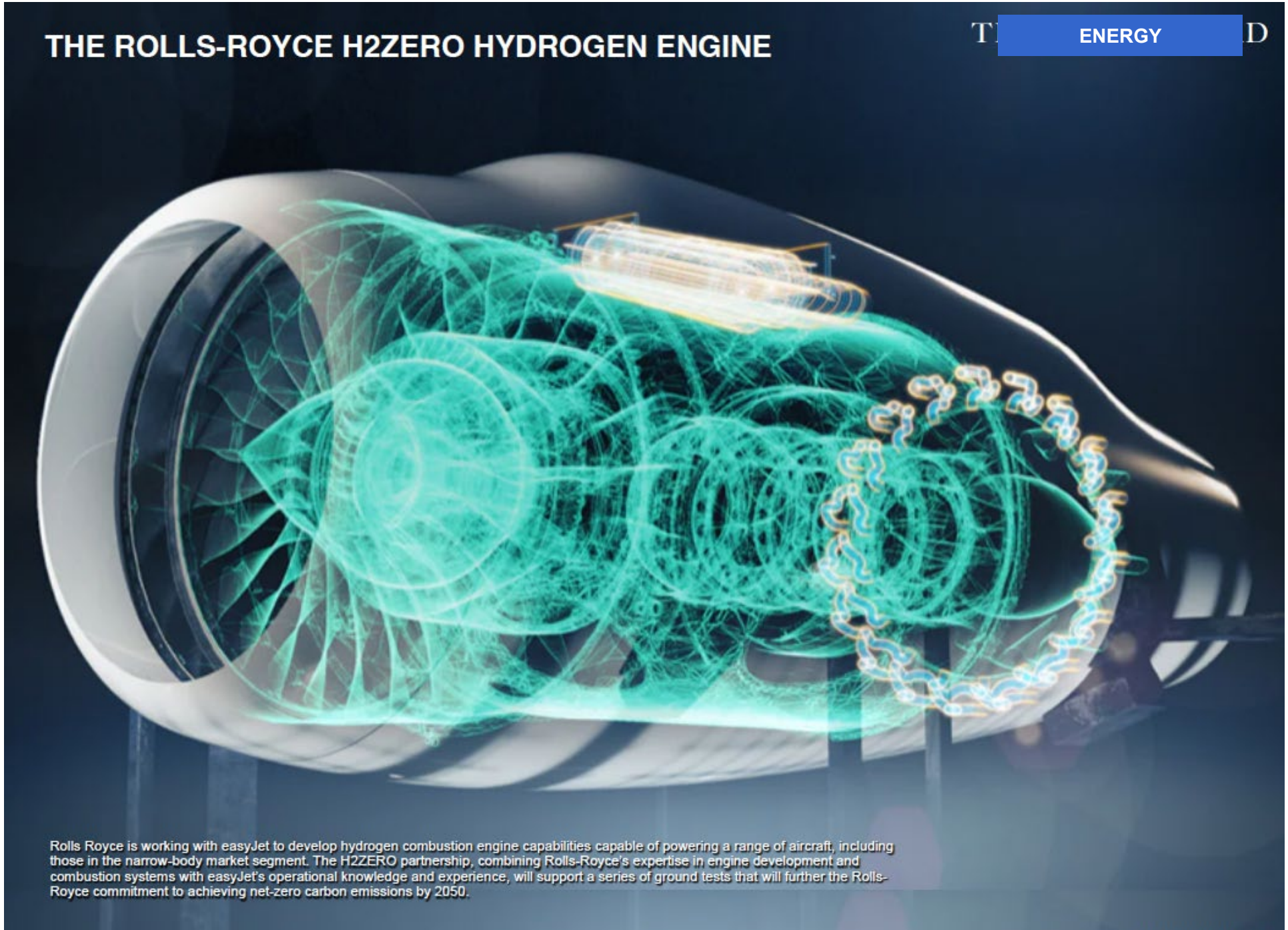

PININFARINA E-MOBILITY
THE ROAD AHEAD
Pininfarina, Bosch and Benteler have started a strategic collaboration to provide car manufacturers with new modular electric vehicle platforms. Combining their vehicle integration expertise allows them to jointly face market with a complete package. Final goal is a new modular, scalable and tailor-made e-mobility plan developed together with future clients, who can also count on unparalleled benefit: a unique style signed by Pininfarina.
THE CIRCULAR 87

LIUX UNVEILS PLANT-BASED ELECTRIC VEHICLE

In Spain, sustainable automotive company LIUX has unveiled a 3D printed electric vehicle prototype that uses 90% recycled and plant-based materials. Named Animal, the car's body, interior, and chassis are made from biopolymer fibers and resins. Body panels are made from cork and linen. "A large part of the outer bodywork" will be made of vegetable fibers, especially flax, that is formed and molded with vegetable resins, LIUX says. "The objective is to run small factories, with the capacity to produce about 25,000 units per plant and to place different factories in different geographical areas, close to demand," the carmaker adds. Animal also boasts a top speed of 200 km/h and 70% lower carbon dioxide emissions than a conventional EV.

THE ROLLS-ROYCE H2ZERO HYDROGEN ENGINE

ENERGY



Rolls Royce is working with easyJet to develop hydrogen combustion engine capabilities capable of powering a range of aircraft, including those in the narrow-body market segment. The H2ZERO partnership, combining Rolls-Royce's expertise in engine development and combustion systems with easyJet's operational knowledge and experience, will support a series of ground tests that will further the Rolls-Royce commitment to achieving net-zero carbon emissions by 2050.

CUTE DRESS! IT USED TO BE STEEL FACTORY WASTE EMISSIONS

Popular fast fashion brand Zara has unveiled a party dress partially made from Chinese steel factory emissions.

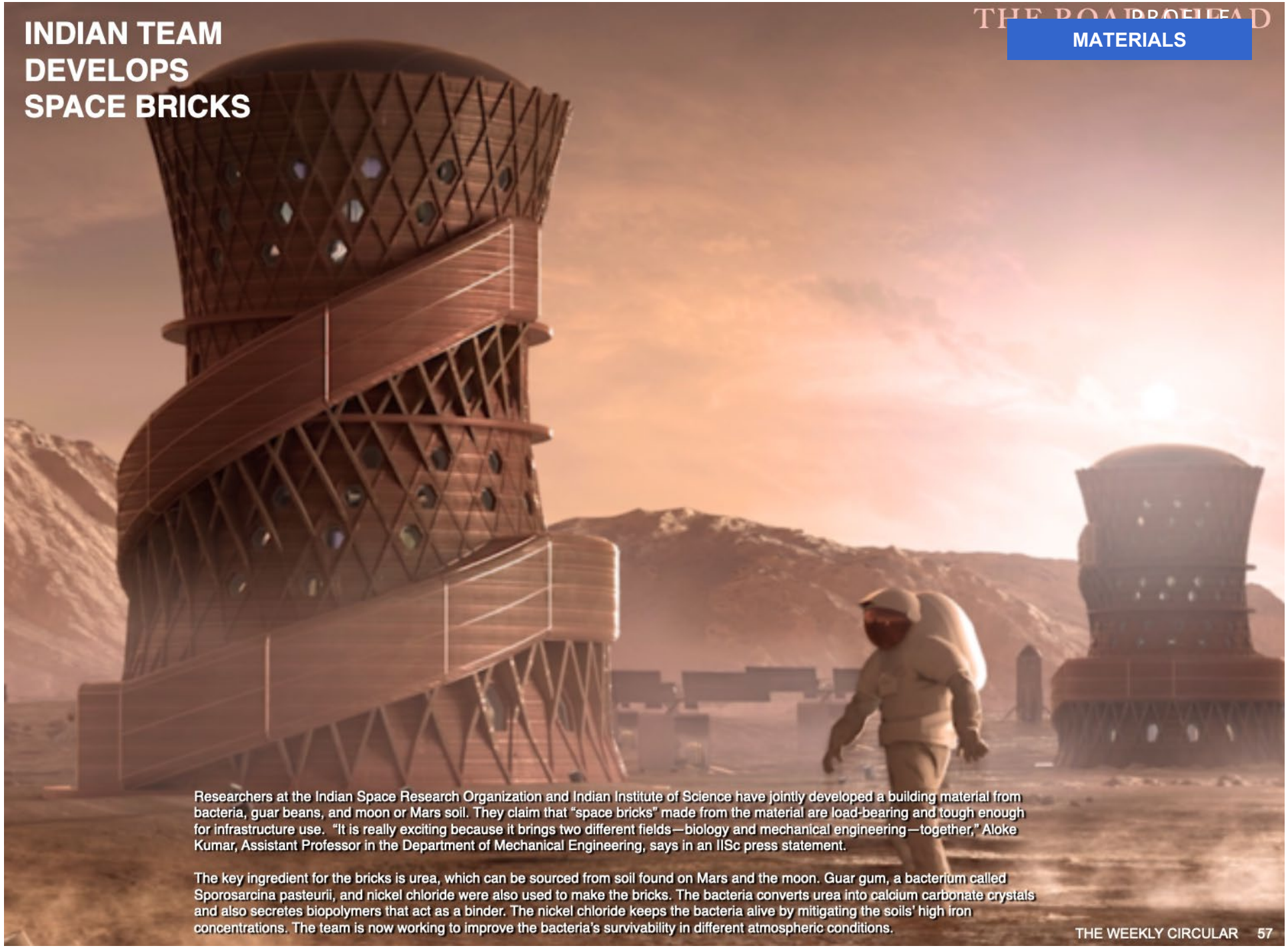
LanzaTech recycles the emissions into Lanzanol (ethanol) through a fermentation process. The Lanzanol is then converted into low carbon monoethylene glycol by the company India Glycols Limited which is then converted into low carbon polyester yarn by Far Eastern New Century.

Zara parent company Inditex says the dress is the first apparel application to use LanzaTech's material. Swiss retailer Migros has already used it to make plastic bottles, while Unilever is using it in laundry pods and dish soap in the German market. Another brand is converting using ethylene—made by dehydrating the ethanol—in foam for running shoes.

Lululemon is also evaluating LanzaTech's material for yoga pants.

MATERIALS

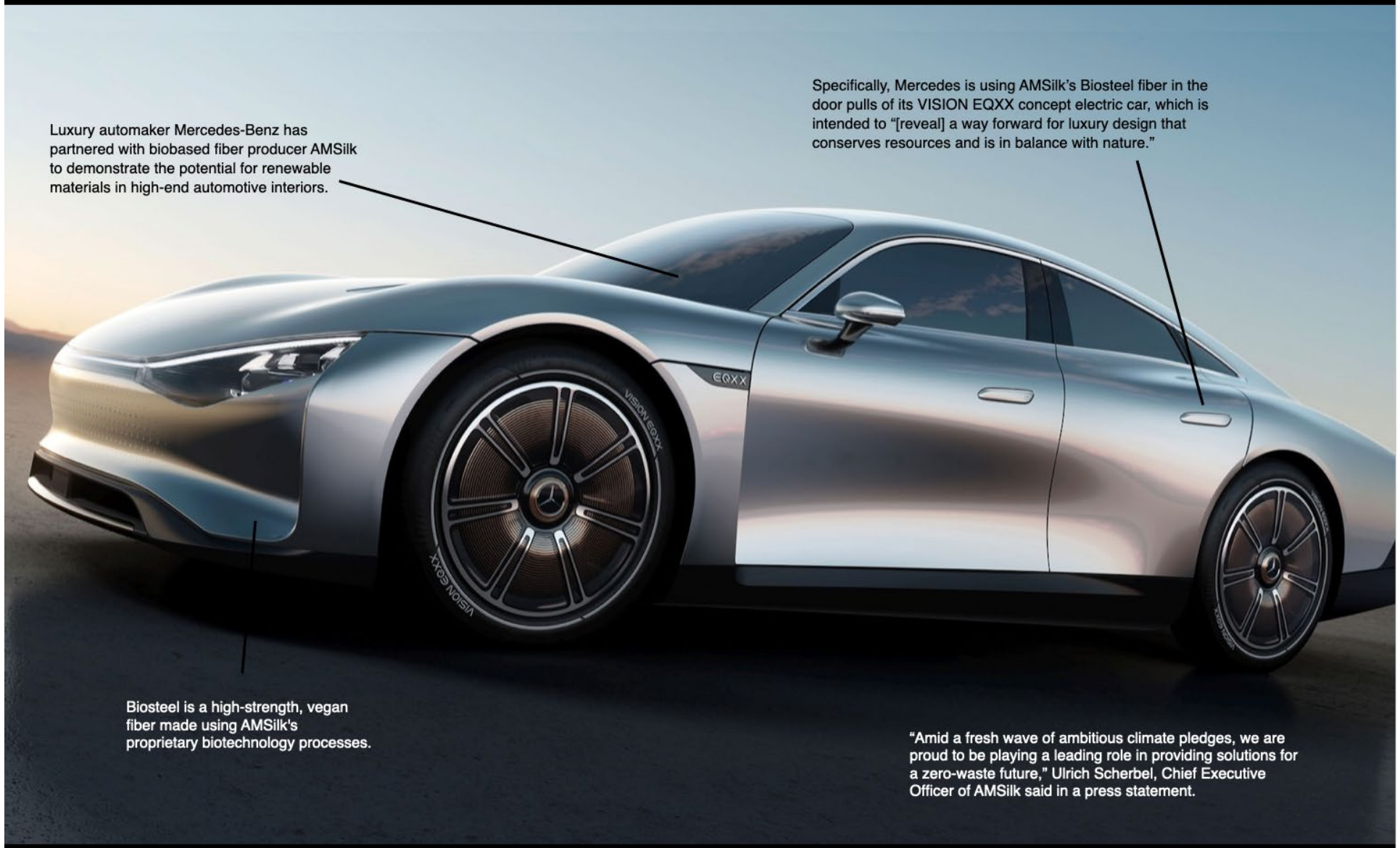
INDIAN TEAM DEVELOPS SPACE BRICKS



Researchers at the Indian Space Research Organization and Indian Institute of Science have jointly developed a building material from bacteria, guar beans, and moon or Mars soil. They claim that "space bricks" made from the material are load-bearing and tough enough for infrastructure use. "It is really exciting because it brings two different fields—biology and mechanical engineering—together," Aloke Kumar, Assistant Professor in the Department of Mechanical Engineering, says in an IISc press statement.

The key ingredient for the bricks is urea, which can be sourced from soil found on Mars and the moon. Guar gum, a bacterium called Sporosarcina pasteurii, and nickel chloride were also used to make the bricks. The bacteria converts urea into calcium carbonate crystals and also secretes biopolymers that act as a binder. The nickel chloride keeps the bacteria alive by mitigating the soils' high iron concentrations. The team is now working to improve the bacteria's survivability in different atmospheric conditions.

MERCEDES-BENZ TAPS AMSILK FOR CONCEPT CAR MATERIALS



Luxury automaker Mercedes-Benz has partnered with biobased fiber producer AMSilk to demonstrate the potential for renewable materials in high-end automotive interiors.

Specifically, Mercedes is using AMSilk's Biosteel fiber in the door pulls of its VISION EQXX concept electric car, which is intended to "[reveal] a way forward for luxury design that conserves resources and is in balance with nature."

Biosteel is a high-strength, vegan fiber made using AMSilk's proprietary biotechnology processes.

"Amid a fresh wave of ambitious climate pledges, we are proud to be playing a leading role in providing solutions for a zero-waste future," Ulrich Scherbel, Chief Executive Officer of AMSilk said in a press statement.

MATERIALS

WILSON SERVES UP SUSTAINABILITY WITH NEW TENNIS RACKET LAUNCH

Wilson Sporting Goods has launched new sustainable offerings for tennis players, including performance rackets made from bioplastics, recycled plastics, and waterborne coatings.

The rackets also use biodegradable polyurethane for their grips.

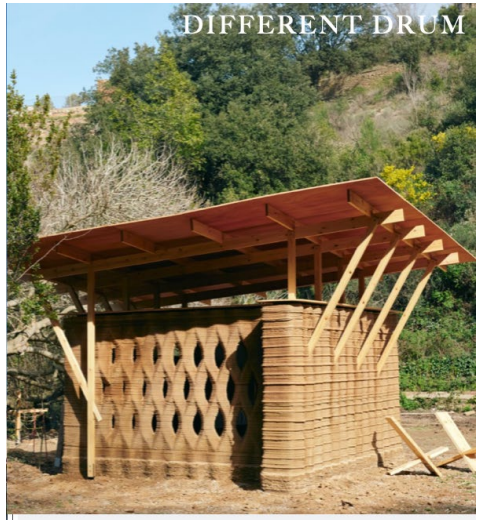
Hans-Martin Reh, Global General Manager of Wilson Racquet Sports, says in a press statement that the Earth Day Series of rackets are "thoughtfully crafted in a more sustainable manner, while not compromising the performance integrity of the rackets that players around the world utilize to bring their best to every match."

All three retail for $299 and use Agiplast, a biobased and recycled material produced by Arkema, in their butt caps and bumper grommets.

ARCHITECT ENVISIONS “LIVING HOMES” THAT KEEP YOU WARM IF YOU FEED THEM (BUT MAY OCCASIONALLY SNEEZE)

Architect Juan Manuel Prieto has used artificial intelligence to conceptualize “Habitable Monsters” to draw attention to the potential of living architecture. Made of organic materials such as muscle tissue, fur, scales, tentacles, and even fangs, the living but (hopefully) non-sentient structures would be energy-efficient, feeding off of the waste of its inhabitants.

In a submission to online publication design boom, Prieto says Habitable Monsters urges humanity to “move into the warm womb of a living organism” that may drool or sneeze but doesn’t require environmentally damaging materials like concrete or metals to construct. When its inhabitants move, the monster/house simply dies and decomposes. Prieto believes such structures are possible, thanks to biotechnologies similar to those being used to grow meat in labs. “Although we are still far from the cultivation (or breeding?) of buildings, there is no doubt that sooner or later it will happen and that it will be the next revolution in architecture,” he tells design boom.



HOME OF THE FUTURE MAY BE MADE FROM ALOE AND EGG WHITES

The Institute for Advanced Architecture of Catalonia has 3D printed a structure using natural materials including dirt, aloe, egg whites, and enzymes. Dubbed TOVA, the prototype structure is zero-waste and only sources materials from within a 50-meter radius.

“3D printing or additive manufacturing is a great example of km zero construction, as the construction work can be done 100% with local materials and labor,” IAAC tells *designboom.com*. “In addition, the printing system allows highly customizable houses for different use cases; such as communities of homes and services that can be rapidly created using this technology anywhere.” Construction is responsible for over a third of global carbon dioxide emissions, according to IAAC.

Build at Valldaura Labs using a 3D printer from WASP, TOVA’s roof is wooden, and a waterproof coating was added to ensure durability—even in extreme weather conditions. Cavities within the walls help maintain heat in winter and shield from solar radiation in warmer months.

Tory Burch taps Modern Meadow for vegan leather bag

Fashion brand Tory Burch is using material from plant-based leather pioneer Modern Meadow in its iconic Ella tote.

Dubbed Ella Bio, the tote’s outer shell is made of BioFabbrica Bio-Tex™, a USDA-certified plant-based material using soy. BioFabbrica Bio-Tex “feels and looks like leather” but is 64% biobased content, Jennifer Gootman, global head of sustainability & ESG strategy at Tory Burch, says in a press statement.

“It is a great example of a growing movement towards ‘next-gen’ materials that take inspiration from nature but are engineered to have a lower environmental impact.”

Ella Bio sells for $348 on toryburch.com.

PAPER CIRCUIT BOARD IS A STEP TOWARD SINGLE-USE ELECTRONICS

Researchers at the State University of New York at Binghamton have developed a paper circuit board that could one day mitigate the growing problem of electronics waste or even enable single-use devices.

It was shown to work with other fully integrated electrical components. After use, the circuit board can be discarded or burned.

The prototype replaces the metal, resin


MATERIALS
SHROOM VROOM
MYCOWORKS TIES UP WITH GM VENTURES TO REINVENT THE CAR

THE RIGHT STUFF

QUT DEVELOPS BIOBASED GLUE FOR GREAT BARRIER REEF

Researchers at Queensland University of Technology have developed a biobased glue that they hope can repair sections of the Great Barrier Reef damaged by cyclones, boats, or bleaching. Leonie Barner, professor of chemistry at the QUT, told the Australian Broadcasting Corp. that the glue is comprised of plant extract and biocompatible polymer. "

So, it has no harmful effects on the marine environment. We have tested that in the lab," Barner said. When damaged, rubble from the Reef gets shifted by currents, and this lack of stability prevents coral from growing. Climate-driven bleaching makes the Reef even more susceptible to such physical damage. The reef-binding glue from QUT could help reestablish stability and allow the Reef to recover. Trials of the material are set to begin within weeks.

DIFFERENT DRUM

BIODEGRADABLE ISLAND A PROMISING METHOD FOR CULTIVATING MARINE HABITATS

Architects Angelo Renna and Apurva Baldawa are trialing an artificial, but biodegradable, floating island designed to sustain aquatic creatures. Dubbed Isolotto, the island is made of a cork inner layer covered in gypsum. The top of the structure is suitable for plant growth, while the bottom features hills and valleys where various aquatic species and plants can thrive. Natural glues keep the layers together.

"The external layer of the biodegradable island plays a fundamental role, facilitating the growth of plants, vegetation, and microorganisms that naturally 'occupy' the island, engendering the creation of new habitats," according to designboom. "This outer stratum, realized using gypsum — a non-toxic material derived from calcium and sulfate — offers a fine powder that can be mixed with water form a malleable paste.

Once shaped and left to harden, the gypsum layer undergoes an endothermic reaction, producing heat. Through rigorous testing, it has been determined that gypsum degrades at a slower rate than clay and terracotta, thus prolonging the island's lifespan and furthering the process of degradation."

Singapore restaurant serves world's first gelato made from air

Casual Italian restaurant Fico has made food history by offering its patrons the world's first dessert derived from thin air. The Chocolate Gelato is made with Solein, a microbial protein-rich powder produced by Finland's Solar Foods. Solein is via a bioprocess where microbes are fed with carbon dioxide, hydrogen, oxygen and small amounts of nutrients. Solein can be used to replace proteins in a variety of foods, including dairy and meat, snacks and beverages, noodles and pasta, and breads and spreads.

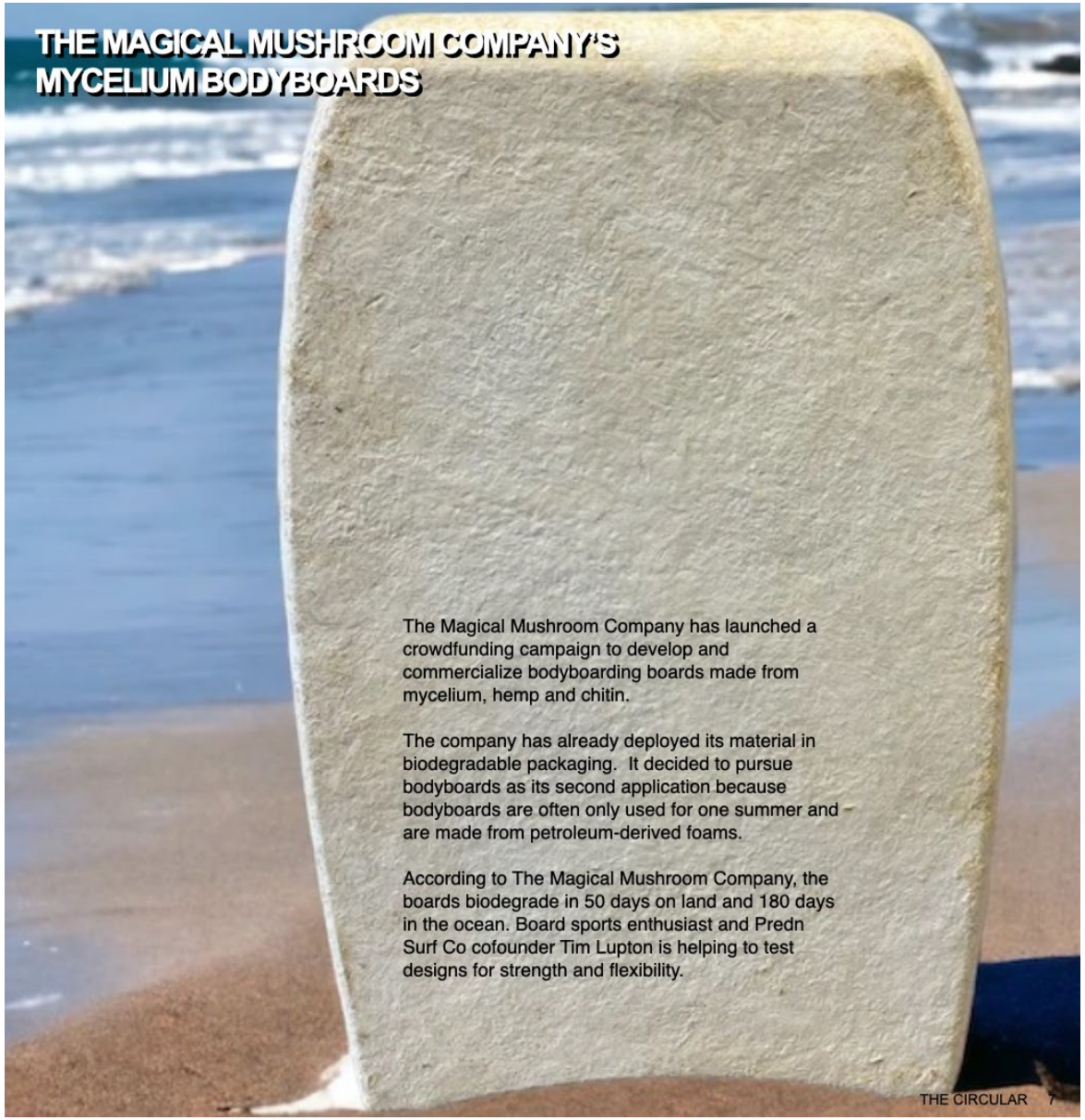
"As a chef, I believe strongly in making food sustainable and responsible. Solein opens up opportunities for us to reimagine the food chain in a way that benefits our planet, without compromising the dishes and flavours we love," Fico Chef Mirko Febbrile says in press statement.

THE MATERIALS REVOLUTION

THE 10 HOTTEST AREAS OF INNOVATION RIGHT NOW

For more than 10 years there has been a revolution underway in materials. Pilot-scale projects were common in the 2010s as chemists and engineers explored the alternatives to petroleum as raw materials. In some cases, it's turning back to the old biobased materials used in a distant past — in many cases, completely new uses, with the promise of new functionality as well as greenhouse gas emission reduction. Net Zero pledges of recent years have put more and more product categories and companies into the mix. Challenges remain on costs — except where brand rather than raw materials make up the bulk of the product's value. Yet, the pace of development and deployment is fast, and getting faster. What are the 10 Hottest areas on Innovation right now? Here's our list, in alphabetical order.

MATERIALS


THE MAGICAL MUSHROOM COMPANY'S MYCELIUM BODYBOARDS
The Magical Mushroom Company has launched a crowdfunding campaign to develop and commercialize bodyboarding boards made from mycelium, hemp and chitin.
The company has already deployed its material in biodegradable packaging. It decided to pursue bodyboards as its second application because bodyboards are often only used for one summer and are made from petroleum-derived foams.
According to The Magical Mushroom Company, the boards biodegrade in 50 days on land and 180 days in the ocean. Board sports enthusiast and Predn Surf Co cofounder Tim Lupton is helping to test designs for strength and flexibility.
THE CIRCULAR 7


THE LAUNCH
Japanese designer Masateru Yasuda creates wood bike
Ddesigner Masateru Yasuda has developed a bicycle that leverages wood's flexibility and ability to absorb vibration.
Moccle is a bicycle that you can easily ride in casual clothes. A simple design that anyone can ride without a complicated transmission," Yasuda tells Yanko Design. "Just pedaling with your usual sneakers, you can spend a relaxing time at your favorite cafe. The bike's simple design highlights its use case perfectly. It isn't made for performance, or for terrain. The Moccle is a purely recreational two-wheeler designed to just enjoy life."
Such attributes, which help make Japanese buildings resistant to the region's frequent earthquakes, are integral to Yasuda's Moccle bicycle. A bent wood frame, made from plywood sheets sandwiching carbon fiber, is held in place with metal fixtures and absorbs shocks from bumps in the road.
"Moccle debuted at Tokyo's Wood Collection Show in January 2023 and won this year's A' Design Award.
THE CIRCULAR 15


THE BRANDSTAND
Werewool looks to proteins for colored textiles
Designer Chiu-Lian Lee is using lab-growth proteins to produce colored textiles, having been inspired to create sustainable change for the fashion industry while a student at the Fashion Institute of Technology in 2018. "I was really frustrated about the status quo of how textiles were being made," she tells Fast Company.
Lee encountered proteins' colorful side through the school's biodesign program, where she saw bright pink fluorescence of a protein extracted from coral. "That vial really captivated us—how nature can create functionality and color through protein structure," Lee says. "You change the shape of the protein, and that's how you can change the color, essentially," she says.
Lee founded Werewool to commercialize the idea. The company, which is backed by seed funding from Material Impact and Solinnova Partners, has produced early prototype pink fibers, which it hopes to turn into textiles. "We're hoping to have a pilot product in the next 12 months," says Lee. "Those will be neon pink protein fibers for your biodegradable pink yoga pants."
THE CIRCULAR 11

ZeroAvia hydrogen plane

From 20 seat regional trips to over 100 seat long-distance flights, ZeroAvia enables scalable, sustainable aviation by replacing conventional engines with hydrogen-electric powertrains.

THE TIME IS NOW

WANTED: 5 Billion Tonnes of Sustainable, Affordable, Reliable, Available Feedstock

4 Principles for Feedstocks of the Future

1. BETTER PROFILE
2. HIGHER YIELD
3. MORE RESILIANT
4. REUSED CARBON


GET
GOING
Growing!

HELP WANTED: OPPORTUNITY IS IN ALL OF THESE AREAS

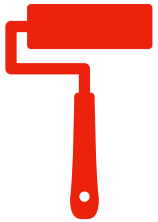

Personal care


Transport

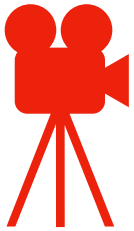

Logistics & Warehousing


Raw materials


Technology R&D

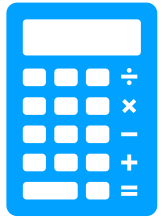

Home Improvement & Maintenance


Sports, Fitness & Recreation


Media & Communications


Building & Construction

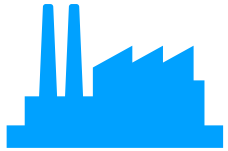

Utilities

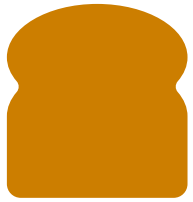

Banking & Finance

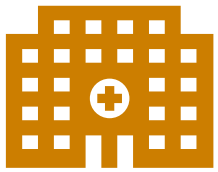

Government


Data Systems


Retailing


Manufacturing


Food Service

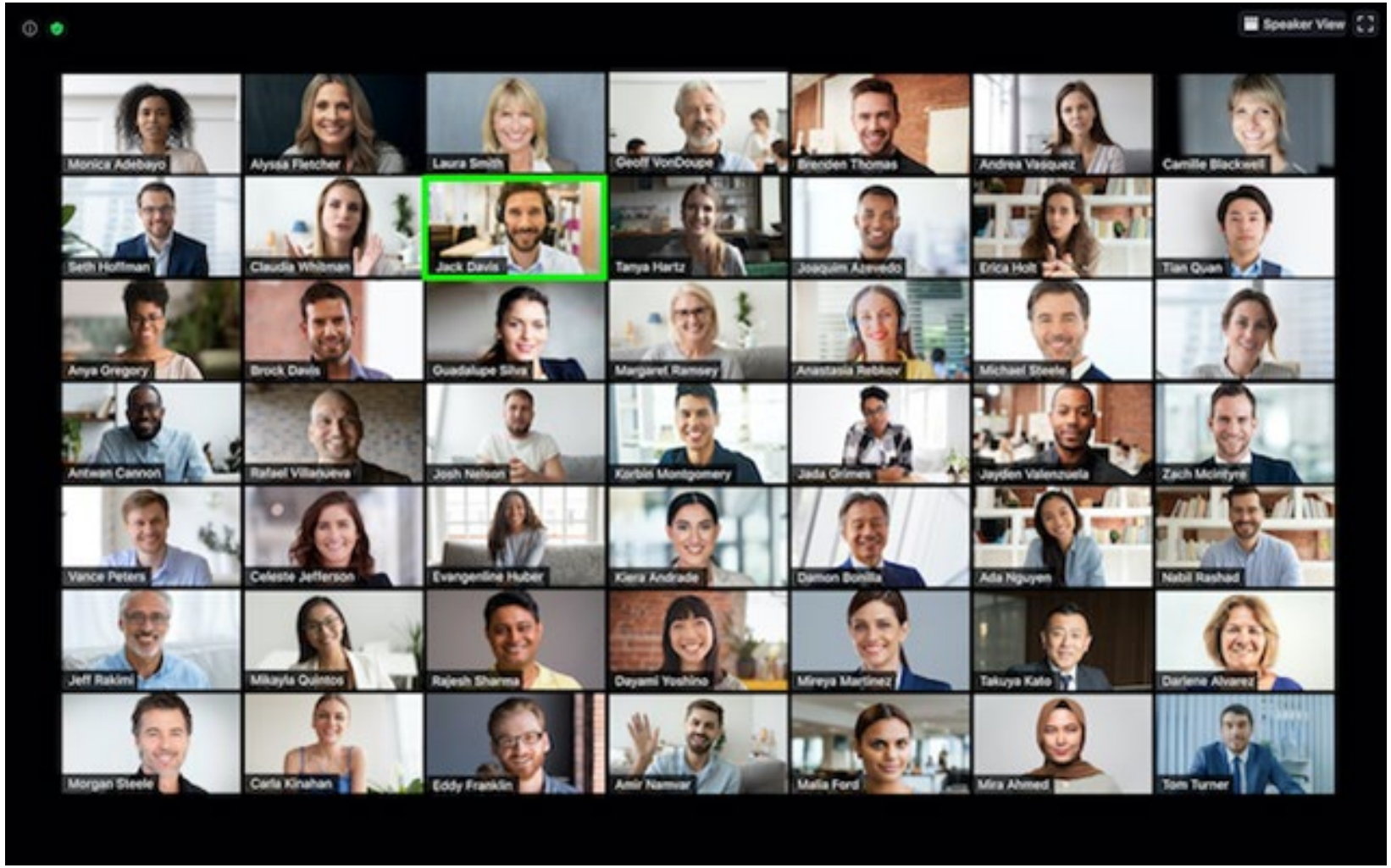

Health Services


Law


Education


Insurance

WORK WILL FLOW TO WHERE THE PEOPLE ARE,
INSTEAD OF PEOPLE FLOWING TO WHERE THE WORK IS.



THE FUTURE BELONGS TO GREAT PLACES TO LIVE.

THANK YOU!

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