Research scientists and physicians are already working on duplicating human organs by bio printing. British designer Agi Haines, however, envisions what it would be like to use a 3D printer to not only replicate existing human organs, but also produce and implant newly designed, improved organs. It might be a way to treat (or cure) chronic diseases and defects. Animal cells with useful properties might even be employed to create entirely new organs. An organ that incorporates electric eel cells could conceivably function as a natural defibrillator by delivering a resuscitating electric shock in case of cardiac arrest. Haines’ designs are speculative; she uses her imagination to visualize future – and often complex and theoretical – scenarios.

Bart Hess – Digital Artifacts, 2013

The designs of Bart Hess, who studied at Design Academy Eindhoven, are inextricably linked to the human body. For his performance Digital Artifacts, Hess used hot wax that forms a thin layer the moment it contacts the skin. A model suspended in a lightweight harness was slowly lowered into a tank filled with water and wax. Every one of the model’s movements caused a thin layer of wax to adhere to her body, “printing” a layer of garment directly on the skin. Hess values the imperfections and irregular shapes created by this process. He sees them as glitches – the small random disruptions regularly found in digital imaging. Digital Artifacts shows us the artist’s vision of future fashion: no more individual garments, but rather a second skin, made new to measure each morning and manipulated at will.
Benedikt Fischer’s work does not have sustainability as its central theme, but he does use found materials, which he then transforms with traditional techniques. For one series of brooches, Fischer cut up discarded construction and ski helmets and worked the surface with a scalpel and an engraving chisel. The resulting effect is reminiscent of animal pelts and tree bark. The Latin names of this jewelry, e.g., *Abelii Abelii* (orangutan) and *Arctos Arctos* (brown bear), refer not only to their pelt-like finishes but also to the animal heads one instinctively recognizes. Expanding his first series, Fischer melted helmet plastic into brooches that resemble miniature snow-capped peaks (named *Akka*, for a mountain range in northern Sweden). He has also reworked anonymous, mass-produced plastic utensils into a series of pendants (*Monocoque*).


About eight million tons of plastic finds its way into the oceans every year. Ocean currents cause this material to accumulate into five large circular vortices (gyres), each up to thousands of miles in diameter – known as “plastic soup.” In time, the plastic degrades into minute particles called microplastics, releasing toxic components into the water and then into our food chain. In 2013, Boyan Slat put his aerospace engineering studies at Delft University of Technology on hold to devote himself full-time to fighting this pollution with *The Ocean Cleanup*. He collected over two million dollars through crowdfunding to continue developing a gigantic, V-shaped array of floating containment booms, 100-kilometers-long, that funnel drifting plastic towards a central storage platform. Debris will be removed from the platform and taken ashore for recycling. This year, a prototype is being field-tested in the North Sea, to see if the design can withstand its heavy seas and bad weather.

**Boyan Slat – The Ocean Cleanup, 2016**

Claire Verkoyen studied at the Université de Paris and the St. Joost Academy in Breda. She has been in charge of the ceramics studio at Amsterdam’s Gerrit Rietveld Academy since 2006. During a visit to Jingdezhen, the region that was the heart of the Chinese pottery industry for over 1,700 years, Verkoyen saw impressive, paper-thin porcelain bowls. She decided to order a few of these vessels to imprint them in Amsterdam with linear drawings she created with special 3D software. The pieces visualize a utopian worldview, in which insect-like beings and machines have taken man’s place, and in which growth and construction processes have become intertwined. Chinese porcelain was imported into the Netherlands as early as the 17th and 18th century. This included pottery especially made for the European market (“Chine de commande”), as well as pieces to be colorfully decorated in the Netherlands (“Amsterdam Bont”). Verkoyen’s bowls continue this Chinese-Dutch relationship.

Dirk Vander Kooij – *NotOnlyHOLLOW Chair, 2014*

Starting with a retired automotive robot, designer Dirk van der Kooij built his own 3D printer. The machine produces thick ribbons of melted recycled plastic to print chairs, tables, vases, and lamps. Environmental awareness is one consideration, but Van der Kooij is also interested in the resulting stratified look and the color effects. The *Not Only Hollow Chair* was printed with a hollow tube of semi-transparent recycled plastic. It resulted in a chair that is both strong and visually striking. The chair in its final design, of which twenty-five were produced, is shown here next to a prototype. The prototype shows the deficiencies of the initial manufacturing process; the plastic was too viscous and cooled too rapidly, so the loops did not stick together well.
Where does the identity of a fashion label begin and where does it end? This is a question that occupies Elisa van Joolen. For the project 11”x17”, she cut tabloid-sized sections (11 x 17 inches) from garments, rearranged them, and combined high-end items with mass-produced ones, just as consumers mix and match in everyday life. In so doing, she breaks the hierarchy of the fashion labels. In her Invert Footwear project, Van Joolen turns Nike and Converse sneakers inside out, to strip the shoes of their brand identity. The exposed stitching reveals the labor of the factory worker, something normally well-concealed by the brand’s carefully cultivated image. For One-to-One, Van Joolen inked items of brand name clothing and used these as a medium for printing on other pieces. Van Joolen’s treatments allow us to look beyond the status conveyed by the label and see its actual, material properties.

Fairphone (Bas van Abel) – Fairphone 2.0, 2016

Bas van Abel founded Fairphone after seeing a documentary on mine worker exploitation. The production of smartphones requires forty – often expensive – minerals including tin, tantalum, tungsten, and gold. Fairphone is committed to conflict-free mining of these minerals. In addition, worker conditions are improved in the Chinese factories where the phones are produced. The modular Fairphone 2, which consists largely of user-replaceable parts, has been on the market since December 2015. Screen, battery, loudspeaker, microphone, and camera can all be removed and exchanged. The phone has provisions for future attachment of a near-field communication chip, a solar cell, and a wireless charger. A Fairphone will last three to five years.
Social structure, people’s needs, and deeply-rooted yearning all play an important role in the work of designer Floor Nijdeken. His 2013 installation *Crossover Collective*, a sizeable needlepoint table, is all about human interaction: encouraging perfect strangers to sit down together to work on a tapestry. Collective engagement in needlepoint makes conversation unavoidable and offers an opportunity to share tips, know-how, and memories. Nijdeken’s installation arises from a desire for social connection and the practice of traditional crafts. Reacting to the anonymous character of mass-produced goods, many designers, particularly young ones, have recently turned their attention to local, historical trades and traditional handwork. Collective embroidery, it turns out, yields a moment of quiet in a busy world cluttered by unceasing information from phones and tablets. The installation often draws an enthusiastic response, especially from young visitors.

The products of Jongeriuslab, Hella Jongerius’ Berlin design studio, include glass and ceramic objects, furniture, textiles, and complete interiors. In her manifesto “Beyond the New” (2015, co-authored with art theorist Louise Schouwenberg), Jongerius speaks out against the prevailing design industry desire for constant renewal. In collaboration with senior designers Edith van Berkel (textiles) and Arian Brekveld (furniture), Jongerius conceived new interiors and seats for the business class cabins of part of KLM’s Boeing fleet. Notwithstanding the strict regulatory confines of the industry, Jongerius looked for new solutions to create comfort for today’s global traveler. Dutch carpet manufacturer Desso used yarn spun from old uniforms – KLM blue, of course – with wool from Scottish sheep primarily bred for their meat, making it the first cradle-to-cradle (fully sustainable) floor covering ever produced in the airline industry.
Since graduating from the Royal Academy of Art and Design in Den Bosch, Smits has produced art for the public domain, sculptures, and conceptual art, as well as furniture and utensils. Spotting the “art” in everyday situations, ideas, and objects, he responds with often simple interventions that bring major issues into focus in a poetic and playful way. In 2013, Smits organized a party for his son and his friends – not for a birthday, but because a routine check had revealed that the child was soon to reach a height of one meter. This milestone was celebrated with a one-meter cake, one meter of soft drinks, one-meter-tall towers of Duplo, one-meter-long party whistles, and a one-meter folding ruler for a gift. 1 Meter Parties have since been organized from Tokyo to Jerusalem; they commemorate a normal yet unique moment in the life of a human being, unrelated to any one culture, religion, or race.

Spotting the “art” in everyday situations, ideas and objects, he responds with often simple interventions that bring major issues into focus in a poetic and playful way. Is that brown liquid called Coca-Cola truly “The Real Thing”, as the company’s ‘70s’ advertising slogan had us believe? Taking a critical look at the soft drink, Smits concluded that it is not the flavoring that is “real”, but its principal ingredient, water. Coca-Cola is sold and drunk the world over, even in places where clean drinking water is unavailable, despite the fact that it takes three liters of water to produce one liter of Coke. Smits reversed the manufacturing process and distilled Coke to recover pure water. He has us consider for a moment how our mindless consumerism affects the world in which we live.
In his work, Jesse Howard stresses the importance of “open design.” He disassembles regular household appliances, then designs his own version and posts his technical drawings and the source of the various components online. His 2012 graduation project at the Gerrit Rietveld Academy was titled *Transparent Tools*, a set of construction manuals for household appliances. Howard had made the devices using components available at any local building or kitchen supply store. These were combined with elements that are easy to print with 3D printers or milled on CNC machine tools at a Fab Lab (a cooperative workshop with computer controlled tools) using free online blueprints. For instance, the switch covers of Howard’s toaster are 3D printed, its sides are milled Corian (a very hard composite material), and the mesh is made of chicken wire. Howard’s objective is not to achieve technical innovation or unusual aesthetics, but to return control of the manufacture of everyday appliances to the consumer.

Marjan van Aubel’s graduation project at the Royal College of Art in London was a cabinet filled with china that stores light energy. Further development of this concept lead Van Aubel to found Caventou, a company named for the French professor of pharmacy who discovered chlorophyll in 1817. Plants use this green pigment to convert light energy to chemical energy in the form of sugar, a process known as photosynthesis. To make its products, Caventou employs a technology based on similar principles. Aubel’s *Current Window* and *Current Table* contain dye-sensitized solar cells (DSCCs) layered between two panes of tempered glass. The dyes are organic pigments that convert sunlight to electrical energy. This type of solar cell is sensitive even to diffuse indoor lighting and indirect light; the energy harvested can be used to charge devices such as phones, tablets, and laptops via USB cables.
Since graduating from design school in 1999, Marleen Kaptein has been working with Stijn Roodnat under the joint name of Kaptein Roodnat. Via Label/Breed, Kaptein entered into a collaboration with the Netherlands Aerospace Centre (NLR). At NLR, Kaptein used what is known as a fiber placement machine; this robot heats and layers thin strips of carbon fiber, which fuse as they cool, forming a strong yet lightweight surface. The machine is normally used for manufacturing structural components for the aerospace industry. For her chair, however, Kaptein explored its aesthetic and technical possibilities, resulting in the Fiber Placement Chair. Seen in profile, the chair looks simple enough, but the seat and back have a complex structure reminiscent of dragonfly wings.

Vinca Kruk and Daniel van der Velden combine graphic design with the critical examination of such topics as branding and visual identity. Having first worked together in 2004 at the Jan van Eyck Academy in Maastricht, they have been the driving force behind designer collective Metahaven since 2006. Its output includes a range of publications and articles, graphic identities, and films. It uses standard typefaces, shadow effects, bright colors, and (fantasy) logos that make reference to the visual language of politics and business. Metahaven often finds itself collaborating with unconventional parties that do not fit the traditional client mold. The collective took it upon itself to design a series of T-shirts and large silk scarves for WikiLeaks. The sale of this merchandise through a London gallery helped WikiLeaks survive a financial embargo by major credit card companies.
Cultured meat, also known as “in vitro meat,” is grown in a laboratory from animal stem cells. This technology is far from advanced enough for large-scale production, but the first such hamburger has already been developed at Maastricht University and it was presented in 2013. While it seems likely that cultured meat will be used to create an alternative to existing products such as hamburgers, sausage, or steak, the technology may also usher in an entirely new food culture. Next Nature Network investigates ways in which in vitro meat could be used in the kitchen. For this project, the innovative green organization, founded in 2005 by philosopher-artist Koert van Mensvoort and designer-editor Hendrik-Jan Grievink, collaborated with Eindhoven University of Technology. The joint effort resulted in the 2014 publication of *The In Vitro Meat Cookbook*, illustrated by Silvia Celiberti. The book describes forty-five speculative (and some quite bizarre) recipes for cultured meat, such as bone marrow cocktail, knitted steak, and meat fruit pie.

Olivier van Herpt works at the interface of traditional crafts and contemporary industrial design. He graduated from Design Academy Eindhoven in 2015 with a collection of remarkable ceramic dishes, bowls, and vases. These had been produced with an advanced 3D printer designed by Van Herpt because he had been unhappy with the limitations of existing 3D printers. For a new design, the artist first investigates the best type and composition of the clay and then makes a digital 3D drawing. His machine has a print head that is moved about by three robot arms. It extrudes layer upon layer of malleable clay which is then fired. Van Herpt’s accomplishment is not merely technical; this innovative application has also created a completely new visual language. His attractive science-fiction-like forms and textures are reminiscent of origami designs, traditional weaving, cacti, and ancient weathered rock.
Patrick Kruithof – *Hollyhock Tile*, 2010-2012

Patrick Kruithof wants to bring about “sustainable experiences” and to challenge the public to take greater responsibility for its environment. To that end, he designed the *Hollyhock Tile*, a project for the city of Rotterdam. A total of 340 paving stones holding hollyhocks (*Alcea rosea*) were placed all across the city. Rotterdammers who adopted a plant were made responsible for its care. One long edge of each tile has a recess for the hollyhock. It is flanked by three holes for bamboo poles that support and protect the growing stem. The thirty-six-dot logo in the top right-hand corner refers to the hollyhock seed pod, which always contains thirty-six seeds. Kruithof hopes that this sturdy plant, which tolerates a wide range of conditions, will be named the new “city flower” of Rotterdam: a symbol of the resilience of its people and the sustainability goals of their town.

Pavél van Houten – wallpapers *Natura Artis Magistra*, 2014

The Amsterdam Zoo is known as Artis, short for its motto *Natura Artis Magistra* or “Nature is the Teacher of Art and Science.” To artist Pavél van Houten, it was the guiding principle in designing wallpapers for offices and rooms to be renovated at the facility. Van Houten, assisted by forty-one volunteers, carried out preliminary research for the project in 2013. The team studied three different botanic species represented in the park, counting and measuring everything from branches and leaves to spider webs and tree bark fissures. The resulting datasets were translated into infographics that were subsequently reworked into wallpaper patterns that hark back to forms found in nature, such as leaves, twigs, and fungi. Van Houten is interested in the rituals of science and religion – two most important endeavors for finding meaning – and he tries to make them comprehensible and concrete.

Design in collaboration with Allard Medema and Maartje de Goede (Circus Engelbrecht)mixed media.
Pieke Bergmans studied graphic, industrial, and 3D design in the Netherlands and completed a master’s in product design in London. Thanks to her characteristically investigative approach, Bergman’s materials, whether glass, plastic, or ceramic, take center stage. The same holds true for neon light, which she studied in depth for her recent series *Phenomeneon*. Bergmans plays with the phenomenon of inert gases – all essentially colorless – emitting light when subjected to a voltage under compression in a relatively small space. As soon as the gas is able to expand, the light grows dimmer, and seems to vanish. Bergmans had glassblowers produce organically shaped, variable diameter tubes, which she filled with the noble gas argon. The effect is mesmerizing: blue neon lines, drawn in space as though by a paintbrush, move about freely, lighting up, or suddenly fading away.

Architect and engineer Pieter Stoutjesdijk’s dream is to help bring about a new type of industry. One that combines open-source design and local computer-controlled manufacturing, where design and production are no longer the domain of a small elite, and ideas, equipment, and technology will be shared. For his 2013 graduation project at Delft University of Technology, he designed housing for the inhabitants of Port-au-Prince, Haiti, who had lost their homes in the devastating 2010 earthquake. The building is made up of 122 ECO Boards, which are panels that can be produced locally from crop residues such as grass, pruning chips, or reeds, and a non-toxic binder. The roof collects rainwater that can be purified on-site for consumption or heated by the sun to generate energy from steam. Stoutjesdijk hopes large-scale construction of the Haiti house will soon be realized, but in the meantime, a first unit has been erected here at the Stedelijk Museum.
Lonneke Gordijn and Ralph Nauta met while attending Design Academy Eindhoven. Together they run Studio Drift. In collaboration with scientists, engineers, universities, and research institutes, Gordijn and Nauta seek out connections between nature and technology. For their *Obsidian Project*, they explored the possibilities presented by residual matter from chemical manufacturing processes. As early as 1972, a Dutch chemist discovered a method for virtual complete recycling of chemical waste by heating it in an industrial furnace to release precious metals like gold and silver. The residual ash can be further processed in a vitrification furnace under conditions that resemble those inside a volcano, and can then be poured into a mould. The result is an intensely black material strikingly similar to volcanic glass or obsidian. Gordijn and Nauta experimented with synthetic obsidian until they succeeded in creating a series of mirrors.


With their patient, almost forensic methodology and their love of experimentation, Andrea Trimarchi and Simone Farresin are often called modern alchemists. Their areas of study have included vegetal polymers (*Botanica*, 2011), leather and other natural “skins” (*Craftica*, 2012), and volcanic rock (*De Natura Fossilium*, 2014). For this latest project, they collected solidified lava rock from Mount Etna, the volcano on Sicily, which they used in a variety of innovative ways. These included processing lava rock into fibers that were woven into tapestries, or melting it to a liquid, glass-like mass from which vases were blown. This gallery, designed by Formafantasma, documents two years’ worth of research into bio-based polymer packaging.
Studio Roosegaarde – Smog Free Ring, 2014-present

Since 2006, Daan Roosegaarde has been collaborating with designers and engineers under the name of Studio Roosegaarde. Their work combines technological innovation, interaction, and beauty, leading to – in his words – “techno-poetry.” Roosegaarde shows us that beauty can also mean clean air for everyone: Smog Free Tower is a seven-meter-high structure that draws in smoggy Rotterdam air and filters it. Powered by a green energy source, the Smog Free Tower is capable of filtering 30,000 cubic meters (just over a million cubic feet) of air while requiring the energy equal to that of an electric kettle. Roosegaarde processes the trapped particulate matter to create tangible “souvenirs.” His Smog Free Jewelry includes rings and cuff links, each piece made from the compressed dust retrieved from a thousand cubic meters of city air.

The Smog Free Project has been made possible in part by the City of Rotterdam, the Doen Foundation and the Port of Rotterdam. It was developed by Daan Roosegaarde, his team of designers and engineers, Environmental Nano Solutions, and advisor Bob Ursem.

Studio Stallinga – Chain Reaction, 2015

Visual artist and industrial designer Henk Stallinga (Tietjerksteradeel, 1962), working under the name of Studio Stallinga, has been designing furniture, lighting, and other products since 1993. More recently, Stallinga has created installations and sculptures that incorporate light, movement, sound, and the passage of time. His monumental light sculpture Chain Reaction is composed of 144 circular tube lights suspended in a large circle as a symbol of eternity. Over the course of one day, the intensity of the light varies progressively, from one circular light to the next, to complete a 24-hour cycle. The installation rotates at the same speed as Earth and also mimics the four seasons. Stallinga uses light and movement to portray time and space. With this design, he strives to establish a long-term relationship with his public: to experience all its different phases, one would have to visit the installation several times during the year.
The collective *We Make Carpets* was founded in 2009 by designers Marcia Nolte and Stijn van der Vleuten and artist Bob Waardenburg. Their shared interest and source of inspiration is the color, shape, and texture of everyday mass-produced objects, which are typically used once and then heedlessly cast away. The same holds true for the innumerable plain cocktail picks, parasol picks, and long drink stirrers *We Make Carpets* used to compose the three installations on view in this exhibition. The collective made the works in the summer of 2015 when they were artists-in-residence in the “Room on the Roof,” a creative workspace in a rooftop tower on De Bijenkorf, an Amsterdam department store.