

REINVENTING



UNITED

SHOES

Rem D Koolhaas

NUDE



Zaha Hadid
for United Nude,
Nova Shoe,
2014

Quintessentially Hadid, this revolutionary design combines innovative materialisation and ergonomic considerations with the dynamism of her unmistakable architectural language to convey an inherent sense of movement. The shoe has a chromed vinyl upper, leather inner, and fibreglass wedge.

Based in Amsterdam, United Nude is a world leader in the design of technically advanced architectural footwear. After working separately with fashion designer Iris van Herpen and architect Zaha Hadid, the practice went on to collaborate with a number of pioneering architects and product designers worldwide for an exhibition at the 2015 Salone del Mobile in Milan. As a cofounder of the firm, **Rem D Koolhaas** recounts the journey so far, revealing the questions it raises and the capacities and limitations of 3D printing in this field.

Can shoes be architecture? This is the question I asked myself when designing my first shoes, before starting my thesis project as part of my architecture studies at the Technical University of Delft. As the result of a broken heart over a girl, I had scaled-down architecture to its most vulnerable scale, that of a woman's foot. But simply making a shoe was not a large and complex enough project for graduating with a Master's degree at Delft, so I ended up designing a shoe that I reinterpreted as a form of architecture at five different scales: part of the human body (a shoe); the human body (a sofa); a living space (a villa); a large building; and a landscape.

Before even graduating in 2001, I was already developing shoes for the new brand United Nude that I had just started with Galahad Clark, a seventh-generation shoemaker from the Clarks shoes family. Two days after my graduation I was back in Italy developing prototypes, and the products were launched in 2003. We found ourselves operating in a design vacuum with our architectural shoes. Our products were, and still are, especially loved by designers and people with an interest for design.

3D PRINTING

In 2001, for the development of our heels and for making prototypes, we began to use 3D printing for the first time and have used it as such ever since. However, it was not until much later that we started to make final products in this way. We knew 3D printing was not practical for mass-produced shoes, but highly suitable for small quantities of limited-edition

experimental designs. This led to several collaborations with 3D Systems, the company founded by the inventor of 3D printing, Chuck Hull.

With the introduction of a new selective laser sintering (SLS)-printed rubber material we were able to undertake a project with a select group of designers with whom we had previously been in contact about making shoes. We prefer to use SLS printing over stereolithography (SLA), as SLS solidifies materials from melted powder fragments, whereas SLA solidifies them from a liquid resin that is more sensitive to heat, leading to potential deformation. With SLS printing we work with two different materials that are later bonded together with glue. The SLS-printed polyurethane rubber is soft enough to hold the foot, but its sandpaper-like texture makes the shoes comfortable only for the duration of a quick photo-shoot or performance, so they are more like wearable sculptures.

COLLABORATIONS

United Nude has gained a strong reputation through partnerships such as our collaboration with Dutch fashion designer Iris van Herpen, over nine consecutive seasons from 2010 to 2014. This has kept us pushing boundaries, inspired us to work with others, and also inspired others to work with us. The first shoe we developed with Zaha Hadid was the Nova (2014), however it was the second, Flames shoe (2015) that was actually the first one to be fabricated, as we had to change to another production method and therefore a different design approach because of a delay with the 3D printing materials. With 3D printing there is much greater freedom in terms of shape and complexity, allowing us to create shoes that otherwise would have been impossible to produce.

This second time we worked with Zaha was as part of a larger group including architects Ben van Berkel and Fernando Romero, and product designers Ross Lovegrove and Michael Young, for the project Re-Inventing Shoes. I would fly around the world to work with each of them face to face, giving them a brief and a toolkit, as for most this was their first experience of designing shoes. Their custom designs really pushed the boundaries, and for this level of experimentation 3D printing works very well, as its speed and accuracy make it possible to develop several prototypes one after the other. However, from an economic perspective, for anything with larger production numbers, conventional production methods will always be more affordable. Post-processing included ice blasting and colouring, some of which was done by paint dipping and some by spraying, depending on the desired finish. The final products were launched at our 'Re-Inventing Shoes' exhibition at the 2015 Salone del Mobile in Milan.

After this very ambitious project, we produced a shoe with New York-based designer Francis Bitonti. The Mutatio Shoe (2015) has gold-plated SLS-printed (nylon) wedge heels combined with a traditional leather upper. Due to the lack of comfort of the softer 3D-printed rubber materials we had used previously, it proved to be a lot more practical to use non-3D-printed materials for holding the foot in the areas touching the skin. In future more agreeable 3D-printed materials may be available. There is still a lot of room for material improvements; 3D printing is really at a very early stage, and the best is yet to come.

Zaha Hadid
for United Nude,
FLAMES,
2015

Hadid's design for the Re-Inventing Shoes collaboration was informed by the flickering light of fire. Flame-like bands originate from the point of the heel, rising upwards to gently embrace the foot, while the ergonomically optimised foot bed provides comfort and support.





Ben van Berkel
for United Nude,
UNX2,
2015

Part of the collaborative Re-Inventing Shoes project, the aim of the UNX2 shoe was to dress the foot in such a way as to make its form partially visible, to highlight the mechanics of the foot and the visual effects that can be created by the shoe in motion.



Fernando Romero
for United Nude,
Ammonite,
2015

The design of this shoe, part of the Re-inventing Shoes project, finds its beginning at the intersection of the geometry of nature, the human body, and the cosmos. It uses the most cutting-edge 3D-printing technology both in design and execution, but the result is a shoe that could have been an object found in nature, a delicate fossil buried on the bottom of the ocean for millennia.

Michael Young
for United Nude,
Young Shoe,
2015

The process and material allowed the designers to create the unique lattice work that builds upwards around the heeled shoe to produce a boot with the tactility of lacework that is in fact both durable and flexible at the same time.



Ross Lovegrove
for United Nude,
Ilabo,
2015

The filaments or hairs for the shoe were modelled using particle systems and attraction-repulsion logistics paralleling the bionic geometry of the foot. The complex tridimensional polygon mesh provides a watertight geometry whereby nothing is extraneous either in material volume or functional characteristic.



SHOES AS ARCHITECTURE

Following the Re-Inventing Shoes project, a series of interviews were conducted with the designers with whom we had collaborated. Each was asked what connections they could see between shoes and architecture. On the one hand, Fernando Romero thinks that there are a very few connections: 'It's like comparing a long summer abroad with a short trip to propose to your fiancée. Both are nice experiences, but you can't really compare them. The challenges are different, the programmes are different, the ergonomics and timing are different, the desires that should be satisfied by the form are different.'¹ While Ben van Berkel had appreciated our collaboration, he also draws a clear distinction, seeing shoes as more directly related to the human body: '[Creating a pair of shoes] is also of course related more directly to the body compared to architecture, and the way the body moves.'²

Zaha Hadid said she enjoyed fashion and shoes precisely because they capture the mood of the moment, and are more instantaneous than the process of designing and constructing

Francis Bitonti,
United Nude
and 3D Systems,
Mutatio Shoe,
2015

The project is a speculation on the future of customisation. Each shoe in the edition is unique, generated by an algorithm developed by the designer. The shoe has a gold-plated SLS 3D-printed heel and a leather upper.

buildings: 'I'm into fashion and shoes because they contain the mood of the day, of the moment – like music, literature and art – whereas architecture is a very long process from the start of a project to its completion.' Moreover, she pointed out a clear connection between shoes and buildings: 'Fashion and architecture can be considered as components within a single system of design. The immersive experience of a building can be likened to the tactile sensations of wearing a garment or an accessory. Just as clothing is based on the proportions of the human body, architecture must also be structured in relation to the human scale.'³

So can shoes be architecture? This remains an open question. What is abundantly clear, however, is that architects are quite capable of designing elegant shoes. Not only that, but we have shown that an architect can establish a company to reinvent shoes by challenging conventions and breaking the rules. Although, if the truth be known, we ended up breaking the rules not for the sake of it, but simply by not knowing them. ▫

Notes

1. Quote from unpublished United Nude interview with Fernando Romero, spring 2016.
2. Quote from unpublished United Nude interview with Ben van Berkel, spring 2016.
3. Quote from unpublished United Nude interview with Zaha Hadid, spring 2016.

