

Project 1

Project details

Project title	Caskia: Growing a MarsBoot
Researcher	Liz Ciokajlo
Start Date	2016
End Date	2020



[Caskia: Growing a MarsBoot](#) (2016-20) (referred to as the MarsBoot) is an art and design research project positioned in the fashion product sectors. The work focuses on strategies for more sustainable material and fabrication design by proposing systems of manufacture in the enclosed ecosystem, space. The material is brought in small and expanded via growth and 3D print processes with the wearers assistance and own sweat to make woman's boots during the seven-month journey to Mars.

The MarsBoot was commissioned by curator Paola Antonelli, Director of Design and Research, MoMA (Museum of Modern Art, New York) for the exhibition *Items: Is Fashion Modern?*. Ciokajlo was chosen for the footwear category and she elected the 1972 Tecnica Moonboot, inspired by Neil Armstrong's first steps on the moon. The exhibition which took place between September 2017 and February 2018 was MoMA's first fashion exhibition in 73 years. The event attracted 588K USA/international visitors and resulted in the delivery of a [book](#) and an online business/design Coursera course *Fashion as Design*. The course has been running since 2017 and 230K students have enrolled as of March 2021, giving it a score of 4.8 of 5 stars.

A film showing the design narrative can be seen on [this Vimeo link](#).

Funding

- MoMA – \$8,000
- Ravensbourne Research – £1,500
- The Design Museum, London - £1,000

Outputs and outcomes

- MoMA (Museum of Modern Art, New York) *Items: Is Fashion Modern?*, exhibition and book, 588K international visitors, September 2017–February 2018
- The XXII Triennale di Milano, *Broken Nature: Design Takes on Human Survival*, exhibition and book, March–October 2019
- Design Museum, London, *Moving to Mars*, exhibition and book, 80K visitors, rated 4-5 star, September 2018 – February 2019; followed by touring event at Tekniska Museet, Stockholm 2020-21
- Coursera - *Fashion as Design* - business/design online course for students/industry, 230K+ enrolments, rated 4.8 of 5 stars (2,393 reviews) since 2017

Impact and Recognition

MarsBoot received the 2018 Beazley Design of the Year, Design Museum, London, award described as “Oscars of the design world”.

The work was widely covered in national and international media outputs, including:

2017

- Forbes – Rachael Arthurs, *MOMA Exhibition Highlights Biofabrications And New Technologies As The Future Of Fashion* Oct 3, 2017
<https://www.forbes.com/sites/rachelarthur/2017/10/03/moma-exhibition-highlights-biofabrications-and-new-technologies-as-the-future-of-fashion/#2e5f58945d28>
- The New Yorker - Alexandra Lange, *MOMA Makes a List of Iconic Fashion “Items”* September 29, 2017 <https://www.newyorker.com/culture/cultural-comment/moma-makes-a-list-of-iconic-fashion-items>

- New York Times - Guy Trebay, *Van Gogh on Five, Wonderbra on Six: A Tour of MoMA's New Fashion Exhibit* Sept. 26, 2017 <https://www.nytimes.com/2017/09/26/fashion/is-fashion-modern-moma.html>
- The Fast Company - Diana Budds, *The Future Of Fashion In 5 Wild New Garments* 23 October 2017 <https://www.fastcompany.com/90147631/the-future-of-fashion-in-5-wild-new-garments>
- + Wunderman and Thompson - Mary Cass, *Items: Is Fashion Modern* 19 October 2017 <https://intelligence.wundermanthompson.com/2017/10/items-fashion-modern/>
- STYLUS - Alison Gough, *MoMA Exhibits Items: Is Fashion Modern?* 6 OCT 2017 <HTTPS://WWW.STYLUS.COM/MOMA-EXHIBITS-ITEMS-IS-FASHION-MODERN>

2018

- BBC Futures - Diego Arguedas Ortiz *How fungus and sweat could transform Martian exploration* <bbc.com/future/article/20181031-how-fungus-and-sweat-could-transform-martian-exploration> 1st November 2018
- ITV News - *Mars boot made from human sweat and Rihanna's Fenty Beauty among design award nominees* <https://www.itv.com/news/2018-09-11/mars-boot-made-from-human-sweat-and-rihannas-fenty-beauty-among-design-award-nominees>
- LABIOTECH.eu – Clara Rodriguez Fernandez, *Mars Astronauts Might Wear Spacesuits Made of Fungi* <https://www.labiotech.eu/bioart/mars-astronauts-fungi-spacesuits/>
- CLOT Magazine <https://www.clotmag.com/design/liz-ciokajlo-caskia-growing-a-mars-boot>
- Materiability Research Group, *CASKIA* <http://materiability.com/portfolio/caskia/>

2019

- The Guardian Design section - Oliver Wainwright, *From space boots to life as a goat, Milan Triennale takes on apocalypse* <https://www.theguardian.com/artanddesign/2019/mar/04/milan-triennale-review-palazzo-dell-arte>

- Wallpaper – Harriet Thorpe, *Design Museum London invites you to move to Mars*, <https://www.wallpaper.com/design/moving-to-mars-design-museum-london-exhibition>
- **WTVOX - Laurenti Arnault** ‘Growing A MarsBoot’ – *Rethinking 21st-century Materials In Fashion* <https://wtvox.com/digital/futuristic-shoes-for-mars-made-from-human-sweat-and-fungi/>

Project 2

Project details

Project title	OurOwnsKIN: The development of 3D-Printed Footwear Inspired by Human Skin
Researcher	Liz Ciokajlo
Start Date	2015
End Date	2017



The [OurOwnsKINproject](#) utilised human skin performative properties to inspire the design 3D printed footwear structures.

Collaborators, Liz Ciokajlo, Ravensbourne University London (lead concept/footwear designer), Papastavrou (computational specialist/designer), and Solomon (artist/researcher - human skin), put human over machines as design directives for 3D print lattice by design of:

- a parametric framework, inspired by skin's tension lines
- responsive, 'springy', auxetic cells inside parametric framework
- a one-unit structure to seamlessly cover the top of the foot and project lattice depth for sole

The computation was finely 3D printed into a holistic part with a responsive structure allowing the 3D printed material to behave more flexibly than conventionally expected. The design approach capitalized on the fineness of 3D print SLS (selective laser sintering) process taking the approach design structures can impact material behaviours.

Whilst inspiration for future footwear will undoubtedly be informed by new materials and technologies, in order to make designs more relevant to our anatomy and more relatable to humans, the OurOwnsKIN project argues that influence must also come from ourselves, the materiality of our own bodies...Our skin.

Therefore, the researchers have asked 'Could a deeper understanding of how our skin behaves as a material inform the design of 3D printed shoes?'

Research methods utilised have been computational and design development via iterative prototyping. They include:

1. Data collecting to understand mechanics of skin
2. Establishing a computational framework inspired by human skin, both responsive and dynamic.
3. Auxetic lattices and footwear prototypes
4. Electrospinning

Funding

- Ravensbourne Research - £4,000
- MVWorks Makerversity London - £10,000
- Innovate UK, Arts and Technology Pilot Fund - £24,669

Outputs and outcomes

The OurOwnsKIN project has attracted interest from international research groups and major footwear companies through its bid to subvert current industry practices.

Benefits of methods such as this include shorter production timescales, by significantly reducing the number of processes, tools and machines required, in turn lowering financial investment.

Parametric design also enables industry to make changes more easily and cheaply during the early design phases of a shoe, allowing for mass customisation and tailored fit. When coupled with Additive Manufacturing this means that products can be produced for specific user groups, in small runs of production.

The OurOwnsKIN project in particular allows for the customisation of fit to be distributed across different elements of a shoe (contour, material and structure) resulting in a design that fits a wider population for mass production scenarios.

Outputs include:

- Iterative prototypes and material samples for development and exhibition
- [Film](#) conveying the behaviour of the footwear structures
- Book chapter: Papastavrou M., Ciokajlo L., Solomon R. (2020), 'OurOwnsKIN: The development of 3D-Printed Footwear Inspired by Human Skin' in Townsend K, Solomon R, Briggs-Goode A, *Crafting Anatomies: Archives Dialogues, Fabrications* London: Bloomsbury Academia, pages 191-210.
- Exhibitions and talks *Wild at Somerset House*, London (2016), *Material Anatomies* at Digit2Wigets, London as part of *The Design Festival* (2017), *SKIN 2* London College of Fashion Symposia, London (2018), *Global Fashion Conference*, London College of Fashion Symposia (2018), *Design for Disability Summit* 2017, London