

# jemima bradley

design engineering portfolio 2020



# about

I am a third year Design Engineering student seeking a 6 month placement for the months of April - September 2021. I am passionate, hard-working, and determined, aiming to produce the best work that I am able for any project I am a part of.

This portfolio focuses on my work and skills as a product designer, for academic, non-profit, and commercial purposes.

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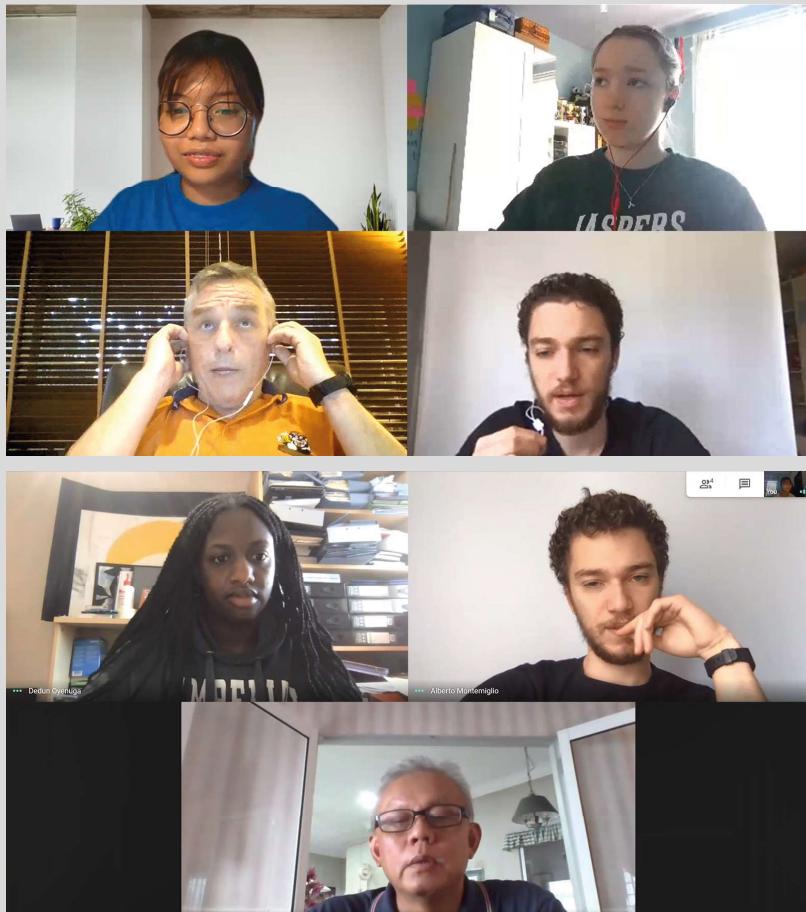
# Rise

An alarm family that can alert anyone, even those with hearing loss.

# Developing products to be accessible is often an afterthought

12 million people in the UK have some form of hearing loss, about one in six.  
By 2035, 15.6 million people will have hearing loss across the UK - one in five.

Remote interviews with deaf users and hearing experts



A large display with large buttons but maybe a version with more traditional display and control for those with normal dexterity

Anything without strobe lights

Sometimes using my phone is inconvenient, especially if I'm trying to conserve battery

I really hate that everything on offer looks like hospital equipment

Not a fan of being unable to trust so many products

I use my phone and smart watch - if I am asleep on my good ear, I do not hear the alarm, but I feel the watch vibrate

Something that's not directly advertised for older folk or kids, that's all you tend to see in adverts

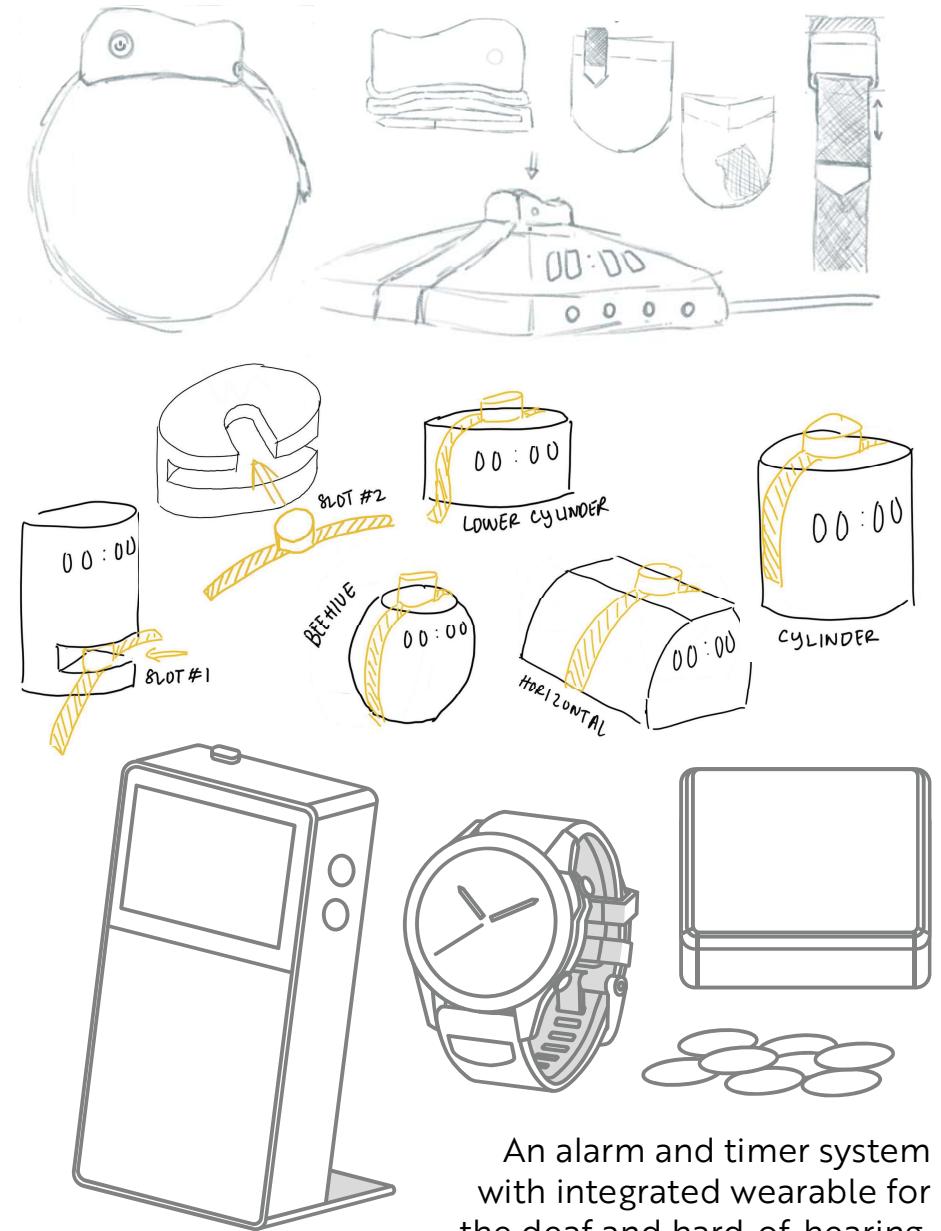
I'd like a gadget with a selection of alarm timings and vibration settings

## Key insights

From surveys and interviews with potential users, immersion, and market research:

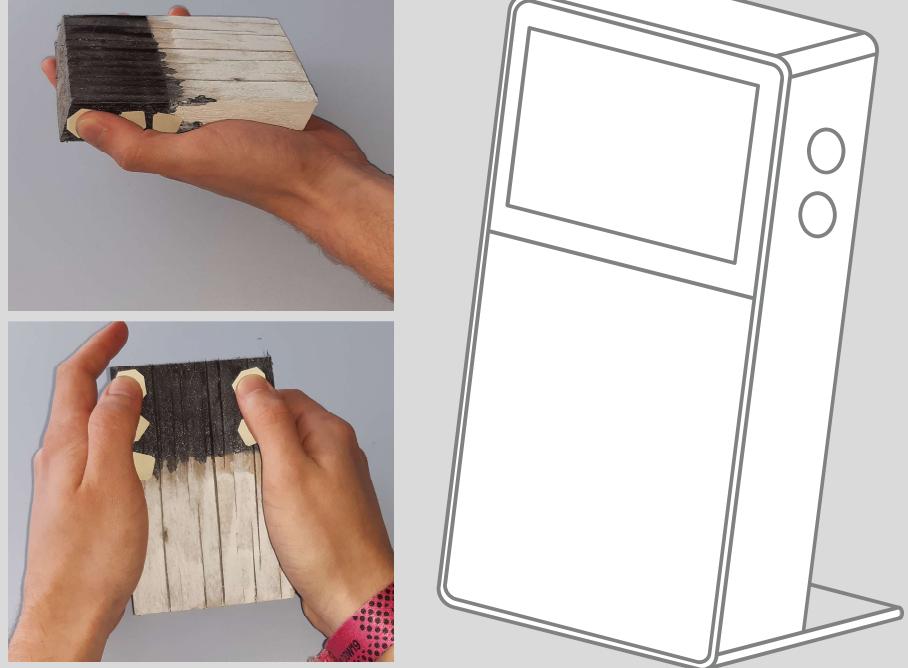
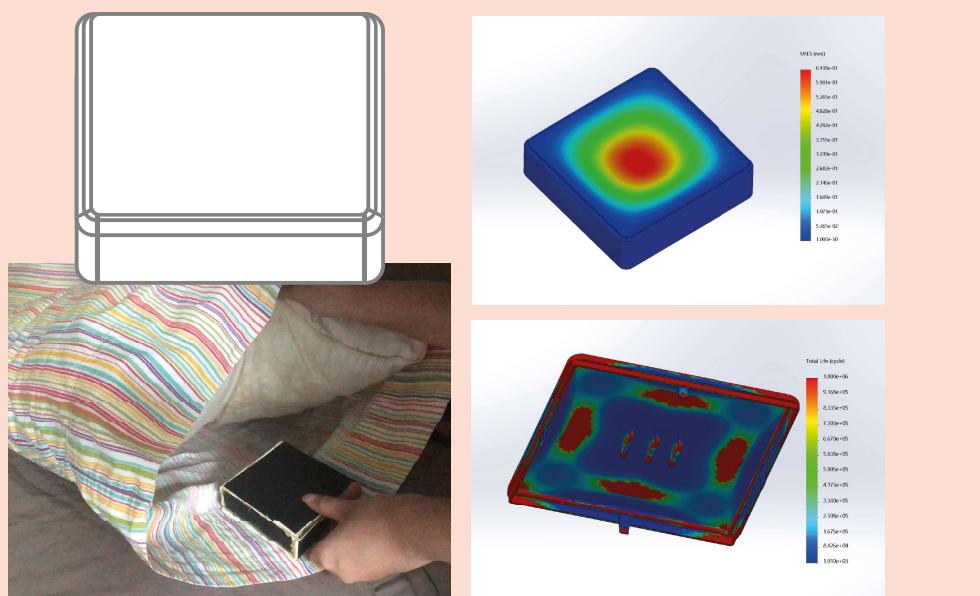
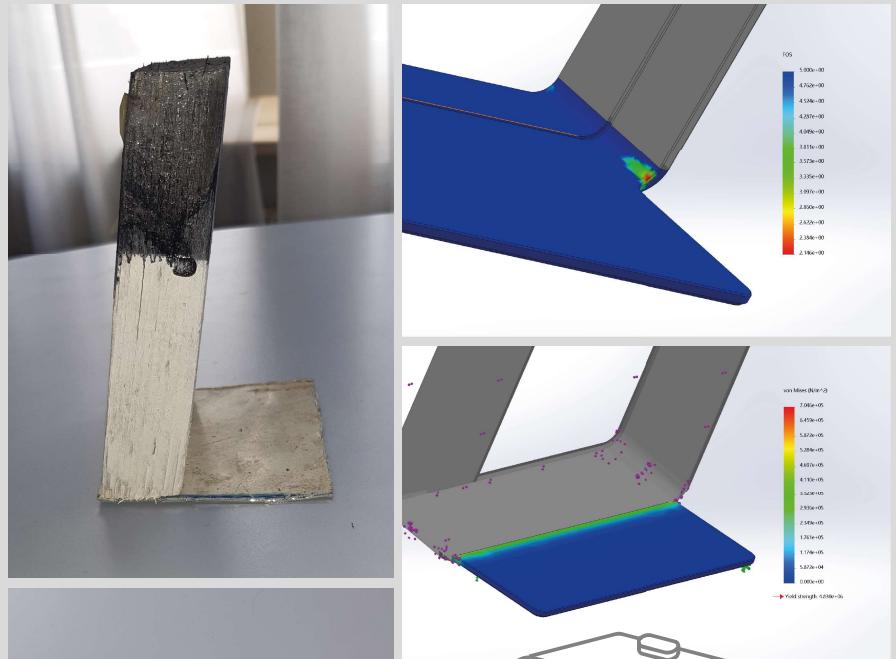
- There is a need for a complete, trustworthy alarm system, that does not require add-ons;
- Customisable settings are vital;
- There is a gap in the market in deaf directed products for younger adults;
- The product needs to enhance independence and convenience for deaf and hard-of-hearing users

# IDEATION



# ITERATION

An alarm and timer system with integrated wearable for the deaf and hard-of-hearing, using customisable light, sound, and vibration alerts

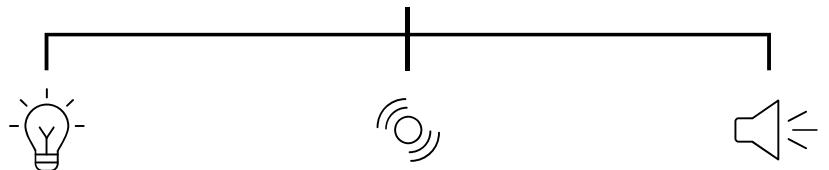




# Rise Dock: The Central Bedside Unit

Acting as both the main alarm clock and settings manager for the Rise Pad, here, the user can control the actuators of their wake up alarms - sound, light, and vibration.

## Rise Dock set alarm



**Rise Hub**

**Rise Band**  
**Rise Pad**

**Rise Dock**  
**Rise Band**

Insights from user research reflected in final product:

There is a gap in the market in deaf directed products for younger adults

Many deaf products on the market are well trusted, but not customisable and not strong enough, so require add-ons

Product should be portable for use in e.g. hotels

Target market is 30-50 year olds, with colour options fit for home use, visually comparable with mass market products for a similar user base

Providing customisable features while not over-complicating the product and still meet the needs of users - all alerts have adjustable levels and modes

Size minimised while keeping digital display large enough to be accessible



## Rise Pad: The Vibration Alarm Alert

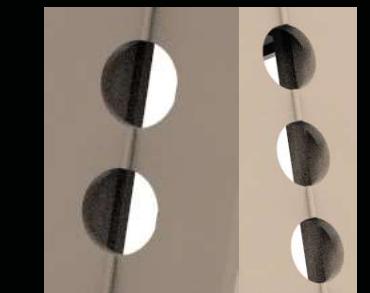
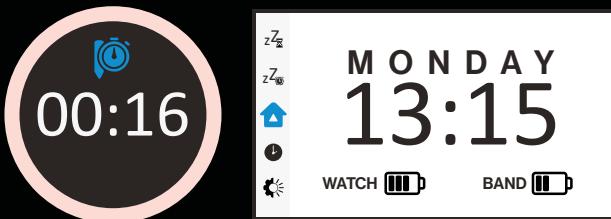
Vibration pads are a frequently featured part of any alarm clock system for the hard of hearing, but often do not act with a strong enough magnitude of vibration to reliably wake the user, and have minimal options for settings.

The chosen motor sits within snap fitted ribs, and gives the Pad a maximum acceleration of 3420 m/s<sup>2</sup>. From under a pillow, this vibration will be slightly dampened but still strong. The settings for vibration can be tested using the Hub.

## Parent Company Alignment

For the purposes of this project, the Rise product family is featured as a Garmin product. To align ourselves with the company, brand, product specific branding, market positioning analyses were completed and the findings integrated into the product development process.

Garmin derived UI

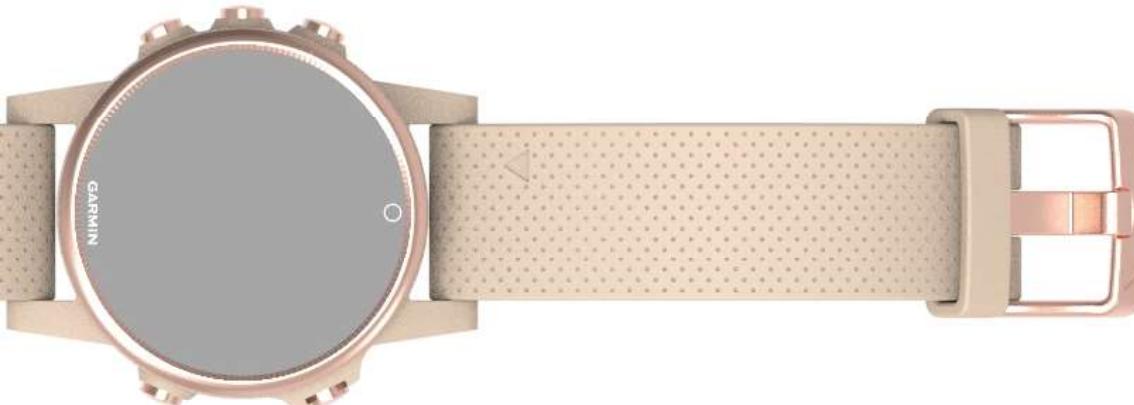


5 button Dock configuration

Packaging that mirrors  
Garmin's new designs



# Rise Band: The Wearable Strap

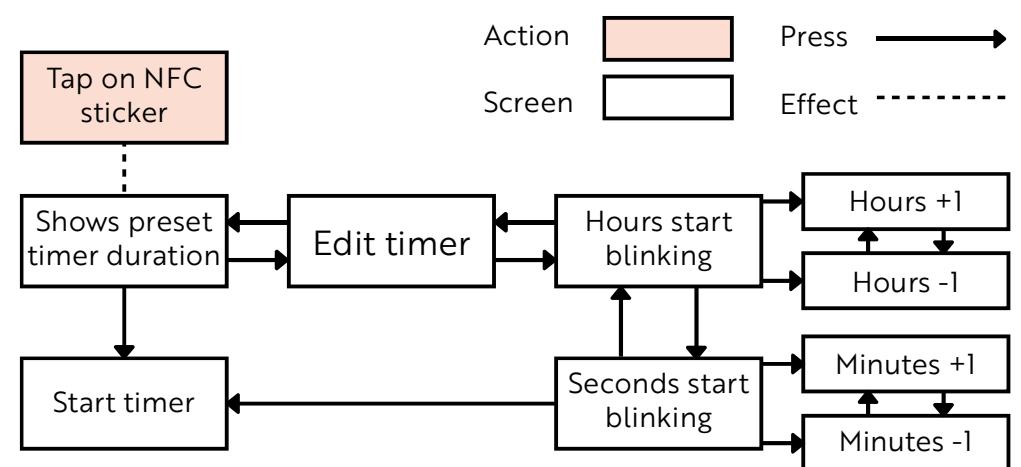
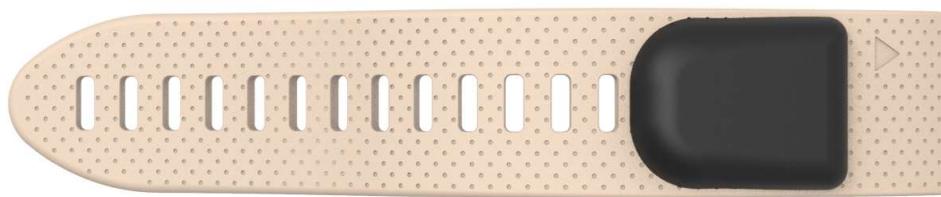


Integrating with a Garmin watch face, the Rise Band allows the user to keep all of the functionality of their watch with the added extras of the Rise family.

The Band's electronic component is charged wirelessly, the battery lifetime matched to that of the watch itself, so that both can be charged in sync on the Rise Dock.



Using various different coloured NFC stickers, the user can activate preset timers on their watch for tasks with only auditory outputs, for example a kettle or microwave.



# The Washing Machine Project



Designing a mechanical  
washing machine concept  
to replace hand washing in  
Iraqi refugee camps.

# 70% of the world population have no electric washing machine access

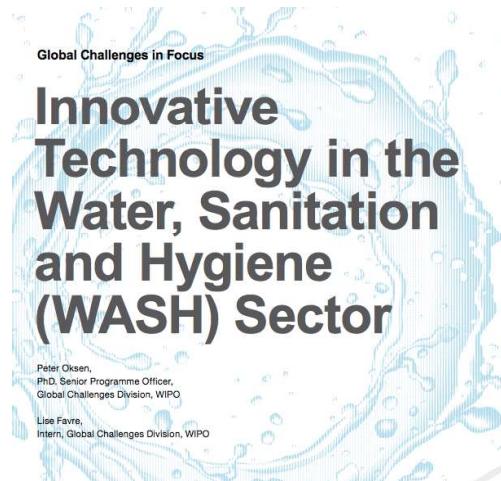
Up to 40 litres of potentially scarce water and 20 hours a week can be used for hand washing clothes every week, a burden that is disproportionately placed on women.

Hand washing is known to cause skin irritation due to submersion in water with washing chemicals, back and shoulder pain due to washing posture, and repetitive strain injuries in the wrists.

Time and effort spent hand washing clothes should be better spent, and The Washing Machine Project is working to make the change happen.

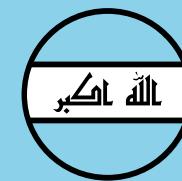


<https://www.un.org/sustainabledevelopment/blog/2015/01/sustainable-development-goals-kick-off-with-start-of-new-year/>  
<https://reliefweb.int/report/world/innovative-technology-water-sanitation-and-hygiene-wash-sector>

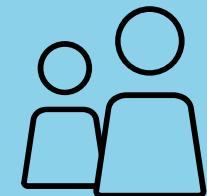


The Project also aims to work towards a relevant selection of the UN Sustainable Development Goals for 2030.

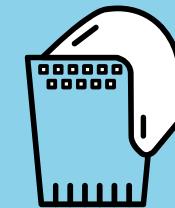
## Design Criteria



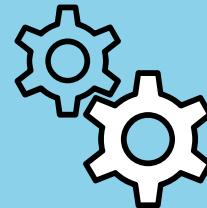
Users from a wide age range



Users from a wide age range



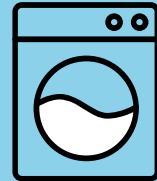
Volume of clothes to be washed



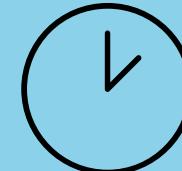
Non-electrical mechanism



Portability



Perform a wash and rinse cycle



Target product lifetime



Water consumption



# IDEATION

Initial ideation to explore ideas and mechanics that could work with a standard mechanical machine

The main metric for a successful wash for users was visual cleanliness, and metrics for a successful alternative to hand washing for users included comparisons of time, effort, and ease of process

As a remote intern with a short project, I chose to focus on concepts for user input, as these would make meaningful difference and could be easily tested without needing a workshop

# Initial Concept Exploration

Design validation through low fidelity prototyping - only Concept 1 was continued to higher fidelity prototyping.

## Concept 1: Collapsible Drum

Portability Internal and external drums collapse so that the machine is a third the size when not in use, making it easier to carry

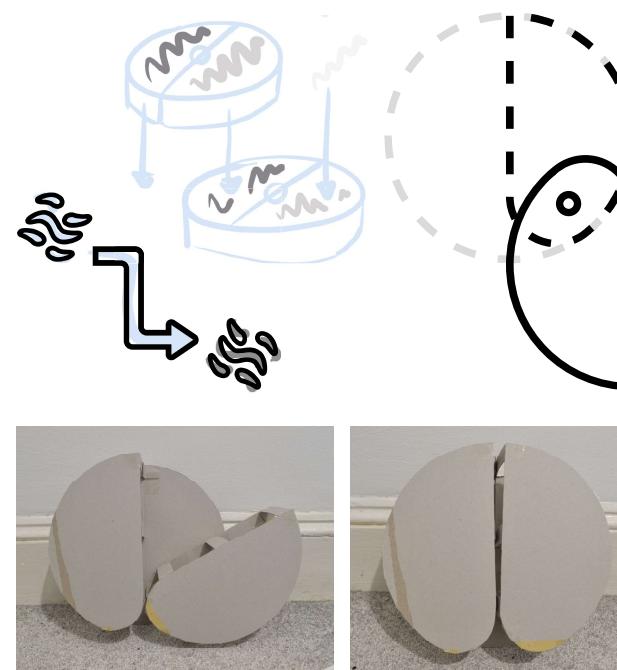
Preventing water storage Smaller space for water to be stored when folded up, limiting incentive for the machine to be used to store water in a soapy, potentially unclean environment



## Concept 2: Water Reuse

Counter Current Principle Following the principle that washing water can be reused twice in different stages of a wash, the machine can store clean water and reduce unnecessary waste

Skin protection By keeping water and washing powder as a separated unit from the drum itself, the user is less likely to experience negative effects from contact



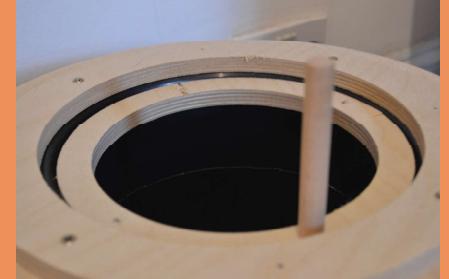
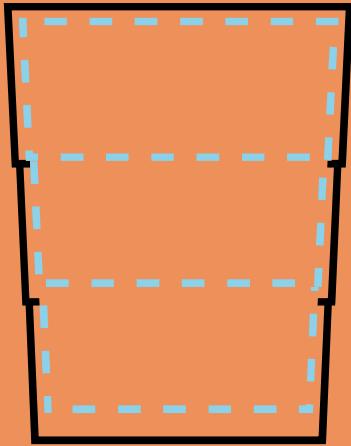
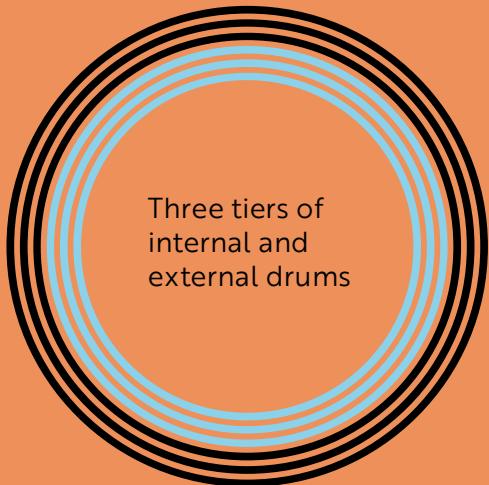
## Concept 3: Linear Input

RSI protection The nature of the linear input depends more on upper arm strength than circular movement, and reduces the chances for wrist injury due to repeated strain

Two user input This design gives the opportunity for two users to operate the system, making it overall an easier and quicker process



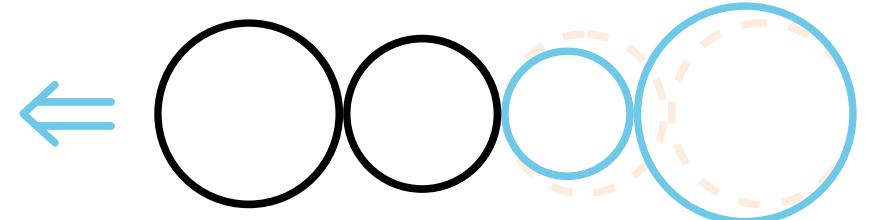
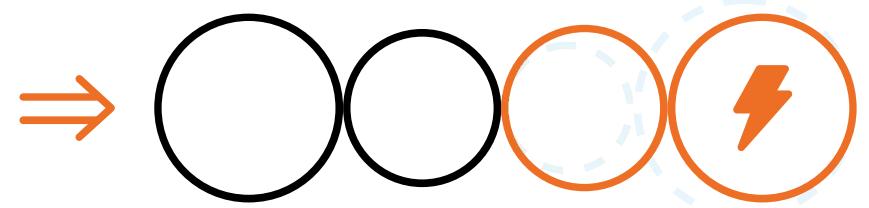
# Concept 1: Collapsible Drum



Using the wind up toy principle of stored energy to power half the machine's cycles

Tangible feedback to the user that their work is having effect, as they are unable to see the effect on the clothes during cycles

# Concept 2: Wind Up



# dreamteam mask project

High-tech, reusable, non-medical antibacterial face masks and ear  
comforter set, designed for comfortable daily use



# "Actions Speak Louder"



In a time of uncertainty and fear, the stress of university has felt daunting for many students. For those returning to campus at Imperial College London, the Dreamteam Merchandise Team worked to provide high-tech branded face masks for the academic year.

## Key project aims:

-  Blend Imperial's branding and a strong message in our design
-  Visually show Imperial's community spirit, especially for new students
-  Minimise the waste associated with our product and packaging
-  Provide students with high-tech mask for the best protection

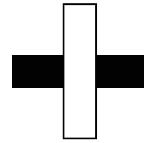
Our branding can be summarised in the saying:  
"Actions Speak Louder than Words"

The action of wearing a mask speaks to our unity as a community, commitment to return to university in the pandemic, and respect for one another, louder than words ever could.



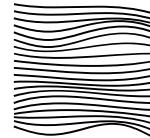
# We are stronger together

The collection went through many iterations to reach the final set of four designs. Each has its own meaning:



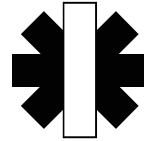
CARE

Care for others in our Imperial community.



TURBULENT

The science helping to find a vaccine



ACTION

No empty words, only action.



SPEECH

Wearing a mask speaks louder than words.

Each of the four designs encompass or are accompanied by a central "I" to represent Imperial and staying strong through troubling times.

Design stages also included focus on the shape of the mask on a users face, and overall quality of material and production.





# The best technology for the best protection

To deliver comfort, protection, and durability at an affordable price, our masks use Swiss HeiQ technology\* in each of the three layers. The technology removes the need for a disposable filter, and combined with the lifetime of 30 gentle washes, reduces the overall waste associated with the product.



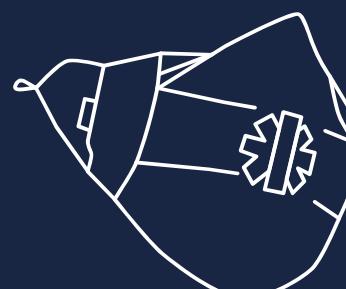
## INNER: SMARTTEMP

Patented dynamic cooling that responds to body temperature and perspiration to make fabric evaporate moisture accordingly



## CENTRE: VIROBLOCK

Antimicrobial technology that is tested effective against SARS-COV-2 utilising silver ion and fatty vesicle technology



## OUTER: ECO DRY & PURE

Uses microscopic 3D structure that imitates duck feathers to allow for water repellency

\*Dreamteam has no affiliation with HeiQ and has not contributed to the creation of their technology.