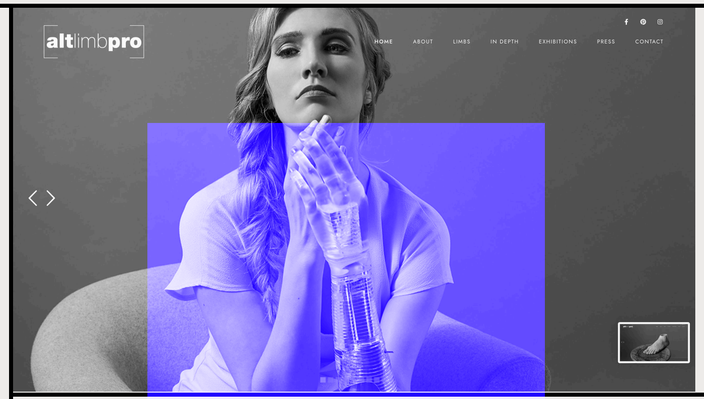
This project proposes a dual outcome: a functional smartwatch/mobile app interface and a personalised 3D-printed prosthetic leg cover. Designed in Figma and Framer, the app enables users to control, monitor, and personalise their smart prosthesis through user-centred interactions—such as switching activity modes, tracking mobility data, adjusting responsiveness, and accessing guided tutorials. The leg cover, based on CAD-ready measurements and developed in SolidWorks, promotes self-expression and identity through digital modelling and 3D printing. Together, these outcomes blend functionality and aesthetics to enhance confidence, mobility, and well-being—redefining prosthetics as empowering extensions of self.



STRIDE

2025

MAJOR PROJECT

PROJECT PROPOSAL

This project aims to create a user-centred solution for lower-limb prosthetic users by combining a digital automation interface with 3D-printed prosthetic leg cover design. Rooted in lived experience and supported by both contemporary and historical research, it explores how assistive technologies, and personalised aesthetics can improve not just prosthetic function, but also identity, confidence, and well-being for amputees.

My goal is to empower prosthetic users to feel confident and motivated in increasing physical activity through assistive automation technology. By enhancing mobility and providing deeper insight into prosthesis functionality, the app encourages users to regain control of their mobility. Gamified features and motivational tools will support fitness goals and overall well-being. In parallel, the 3D-printed prosthetic leg cover enables users to express individuality—redefining prosthetics not as something to hide or just tool to walk, but as an extension of self, identity, and personal style.

At its core, the project will develop a user interface (mobile and smartwatch-based) that allows amputees to interact with and personalise smart prosthetic systems. Drawing insights from Ottobock's Cockpit App and Össur's adaptive prosthetics, the interface will visualise real-time sensor data (e.g., step angle, terrain detection) and allow users to switch between activity modes, monitor performance, and access guided tutorials. The goal is to build trust and autonomy—empowering users to stay engaged and confident in their mobility.

However, this project goes beyond functionality.

Initially, my focus was on enhancing mobility to motivate physical activity. But through user research—and reflecting on my own experience as an amputee—I realised that appearance often matters more than function. As a result, I've introduced a 3D-printed leg cover as a complementary outcome, designed to instil pride in prosthesis appearance and encourage more confident, active lifestyles.

When I became an amputee, my first prosthesis was bulky and unappealing. It wasn't until I received one that aligned with my needs and personal style that I felt confident being seen in public. This transformation had a far greater impact on my motivation and well-being than prosthetic functionality alone. It marked the start of my fitness journey, enabled me to take back my mobility and inspired this project's dual focus on both mobility and self-expression in prosthetic appearance.

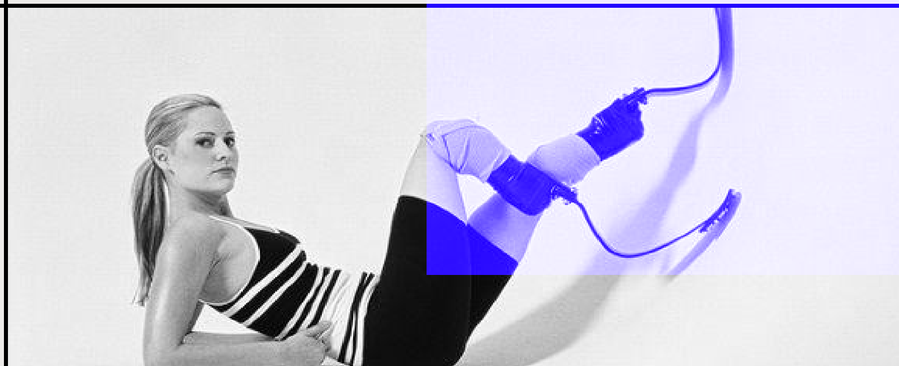
To avoid personal bias, I examined wider case studies—such as Ned Sharples' Prosthetic Technology and Patient Use—which confirmed that many users prioritise appearance over function. I also drew inspiration from pioneers like UNYQ and The Alternative Limb Project, who reimagine prosthetics as bold, expressive, and empowering.
This approach is supported by transhumanist theory, which sees the body as something that can be evolved and personalised through technology. Like UNYQ, this project champions inclusivity by giving users control over how their prosthesis looks and functions according to activity, recognising that identity and self-perception are deeply linked to design.

The project outcomes include a functional app prototype that allows lower-limb prosthetic users to personalise and control their smart prosthesis through an intuitive interface. This is complemented by concept models of 3D-printed leg covers designed to reflect personal aesthetics and promote pride in prosthetic appearance—reframing them as expressive extensions of identity rather than clinical tools. The process will be visually documented, highlighting development stages, materials, personas, and wireframes to deliver a solution that is both inclusive and emotionally resonant.

Proposal

By merging assistive automation with aesthetic customisation, the project empowers users to improve mobility, regain confidence, and embrace their prosthesis as an extension of self. Grounded in user research and lived experience, this outcome challenges the clinical perception of prosthetics —redefining them as expressive, user-driven tools that support both physical ability and emotional well-being.

"my artificial limb is an extension of myself- not just a tool to walk"- Poppy-May 2025



Kiera Roche Limb Power-
The Alt Limb Project

These research questions serve as a foundation to guide my design decisions, validate my ideas, and ensure my project addresses real user needs

research *questions*

01. How can digital interfaces that integrates prosthetic automation enhance amputees confidence, independence and engagement in physical activity.

02. How does aesthetic customisation of prosthetic leg covers impact the confidence, identity, and social participation of amputees

03. How can UX design improve motivation and engagement in prosthetic users to support health and fitness goals?

VISUAL REFERENCE AND *ANALYSIS*

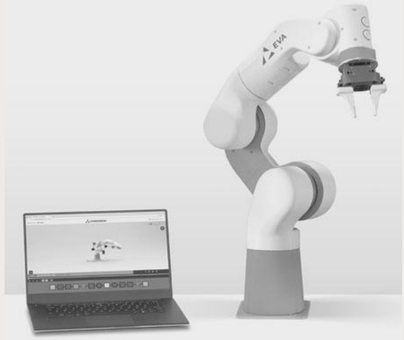
01.

I've closely examined Ottobock's MyModes feature within the Cockpit App as a contextual and visual reference. This system allows prosthetic users to switch between activity modes—such as walking, biking, or standing—based on their environment/terrain and needs. It reinforces my belief that assistive technology should prioritise user autonomy, giving individuals control over how their prosthesis functions in everyday life. This aligns directly with my goal to enhance both mobility and confidence through personalisation.
Visually, MyModes uses a clean, icon-based interface that is easy to navigate and understand. I see this as a valuable model for designing my interface- I wish to visualise these complex data from prosthetics- but simplified through diagrams to reduce cognitive load to avoid overwhelming the user while still offering advanced control. The simplicity of its layout and the clarity of its visual language serve as a strong foundation, which I aim to build on by incorporating more expressive, personal elements that reflect individual identity and preferences. Where MyModes remains function-first and minimal, my interface aspires to integrate a more emotionally engaging experience—reframing prosthetic interaction as not just practical, but also empowering to increase mobility and identity-driven.
By studying the successes and limitations of MyModes, I'm able to develop a more inclusive, adaptive, and visually resonant design

02.

In exploring The Alternative Limb Project, Kiera Roche's Flora case study influenced my approach to prosthetic leg cover design—particularly in understanding how aesthetics and identity can directly impact confidence and self-perception. Kiera's floral-themed prosthetic leg cover, co-created with designer Sophie de Oliveira Barata, doesn't attempt to hide or mimic a natural limb. Instead, it embraces art and symbolism, allowing Kiera to reclaim her prosthesis as a proud and expressive extension of herself.
This case study reinforced the idea that prosthetics are not just medical devices—they are worn objects that exist at the intersection of design, identity, and emotional well-being. Seeing how Flora was celebrated not only functionally but artistically, I realised the power of visual storytelling in prosthetic design. It validated my decision to introduce a customisable 3D-printed leg cover as a secondary outcome part of this project, enabling users to choose designs that align with their personality and preferences.
From a contextual perspective, Flora demonstrates that confidence can be restored not just through enhanced mobility, but through visual empowerment. It shifted my thinking away from purely clinical goals toward a more holistic, user-centred experience that acknowledges pride and individuality as core to well-being. This has influenced both the conceptual vision and the visual strategy of my project, where customisation isn't a luxury—it's a necessity for inclusive, meaningful design.

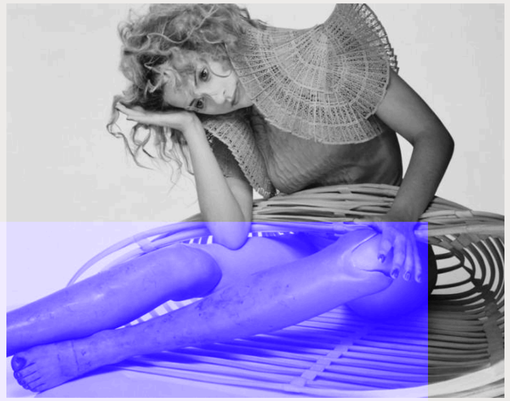
03.



Exploring Automata's work in robotics and automation has significantly shaped my thinking around the role of assistive technology in prosthetics—particularly how intelligent systems can enhance everyday tasks and bodily interaction. Automata's focus on human-robot collaboration, precision, and user-friendly interfaces aligns with my goal of making smart prosthetic systems more intuitive and responsive to individual needs.
What stood out to me was how Automata designs automation not as something cold or overly technical, but as a fluid extension of the user's intent. This concept inspired me to rethink how lower-limb prosthetic users might engage with digital interfaces—moving away from rigid, clinical tools and towards interfaces that adapt in real time, anticipate needs, and provide users with meaningful feedback.
From a contextual standpoint, Automata's approach to automation reinforces my ambition to develop a user interface that is not only functional but empowering—one that has a sense of control, personalisation, and fluidity. Visually, it also pushed me to design interactions that feel clean, efficient, and accessible, much like Automata's robotic systems. Their philosophy helped strengthen the technical backbone of my proposal, affirming that automation can be emotionally intelligent and human-first when grounded in thoughtful design.

VISUAL REFERENCE AND *ANALYSIS*

04.

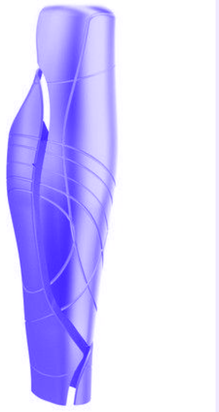


Amie Mullins' collaboration with Alexander McQueen has had a powerful influence on the conceptual foundation of my project. Her work challenged the traditional, medical perception of prosthetics by transforming them into high fashion—sculptural, expressive, and aspirational. Seeing prosthetic legs reimagined as carved wooden boots not only redefined functionality but also elevated prosthetics into the realm of art, identity, and storytelling.
This case study reinforced my belief that prosthetics can—and should—go beyond medical. Mullins' ability to runway with pride and boldness inspired me to think critically about how aesthetic design contributes to self-perception and confidence for amputees. It encouraged me to pursue a design outcome that doesn't just focus on enhancing mobility, but also champions visual empowerment and emotional resonance.
Visually, this influence pushed me to embrace bold, customisable design options for my 3D-printed leg covers—treating them not just as functional shells, but as fashion-forward statements of identity. Contextually, Mullins' collaboration demonstrates that prosthetics can occupy space in both assistive tech and cultural expression, aligning perfectly with my aim to merge user-centred design with individual empowerment.

05.

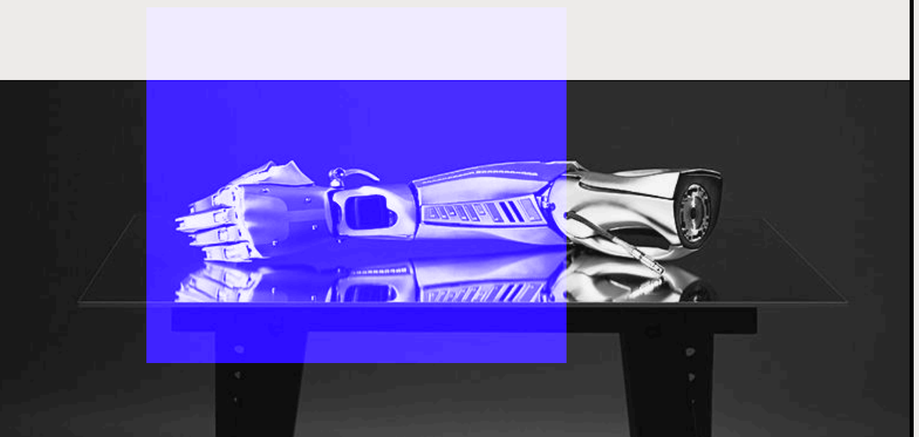
Össur's i-Limb technology informed both the technical and user-centred goals of my project. Their work demonstrates how intelligent prosthetic systems can dynamically adapt to user needs—offering multiple grip patterns, gesture control, and muscle signal responsiveness. What stood out to me most was the seamless integration between hardware and mobile interface, allowing users to personalise settings, track usage, and adapt functionality in real time.
This emphasis on user autonomy deeply resonated with my own goals. The i-Limb system doesn't just restore function—it hands control back to the user, aligning with my desire to create a digital interface that promotes confidence, independence, and interaction improve interaction and understanding of prosthesis. It showed me that smart prosthetics can become more than passive tools; they can become responsive extensions of the body.
Visually and contextually, Össur's use of sleek, intuitive UI design—especially through their paired apps—inspired how I approached the interface of my own prototype. The visual language balances technical information with accessibility and simplified data, and this helped me consider how to present real-time data like step angles or terrain detection in a way that is both engaging and user-friendly. Overall, Össur's i-Limb reaffirmed that advanced prosthetic technologies must serve real, lived needs—merging high performance with emotional and psychological empowerment.

06.



UNYQ's approach to prosthetic design has been a powerful influence on my project—particularly in how they challenge the medicalised, impersonal aesthetic traditionally associated with assistive devices. Their use of custom 3D-printed prosthetic covers as a canvas for self-expression opened my eyes to how design can restore not only function, but also identity and pride for amputees. Seeing how UNYQ collaborates with users to create highly personalised, fashion-forward designs validated my belief that aesthetics are not superficial—they're central to emotional well-being and confidence.
Contextually, UNYQ redefines prosthetics as lifestyle products rather than clinical tools, which aligns closely with the dual focus of my project: to combine mobility-enhancing technology with visual personalisation. Their work reminded me that choice and control in appearance are just as empowering as control over function. It also pushed me to consider how aesthetics and digital tools could intersect—how a mobile interface might enable users not just to control their prosthesis, but to co-create its visual form.
Visually, UNYQ's bold, sculptural design language and material use directly informed the direction of my 3D leg cover concepts and how I wish to approach language and tone of voice. Their designs are not apologetic or hidden; they are proudly visible, even futuristic—helping users reclaim visibility on their own terms. This inspired me to treat the leg cover not just as a cosmetic shell, but as an expressive, identity-driven object that celebrates individuality and challenges norms.

IDENTIFIED *MEDIA* AND PROCESSES



FUNCTIONAL *MOBILE/ SMARTWATCH* APP DESIGN

Functional Mobile/Smartwatch App Design

Media:

- Figma – For designing the UI/UX of both mobile and smartwatch versions
- Framer – For building a high-fidelity, interactive functional prototype

Processes:

1. User Flow & Wireframes: User journeys and wireframes in Figma based on user needs and personas.
2. UI Design: Clean, accessible, and visually engaging interfaces tailored to prosthetic users.
3. Prototyping: Import designs into Framer to create a fully interactive prototype that simulates app behaviour and transitions.
4. Testing: Conduct usability testing sessions using Framer or Figma prototype with target users to refine the interface.

3D PROSTHETIC *LEG COVER* DESIGN/PRINT

3D Prosthetic Leg Cover Design & Print

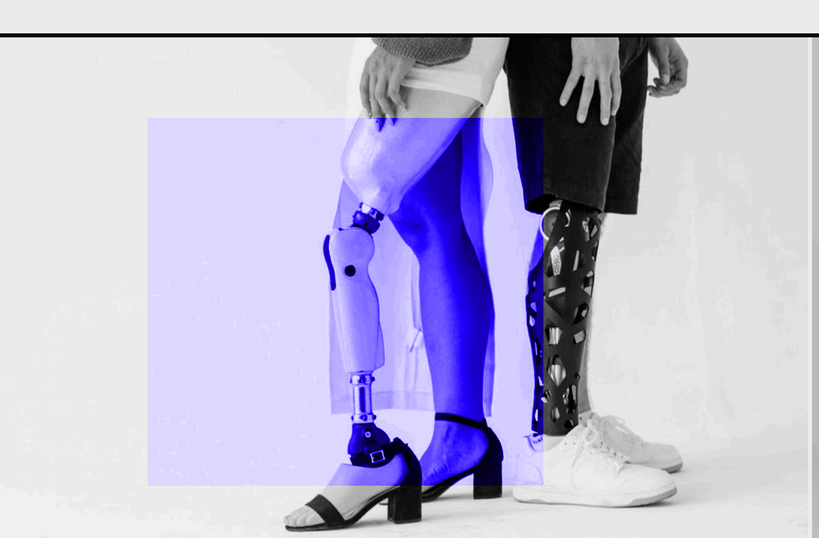
Media:

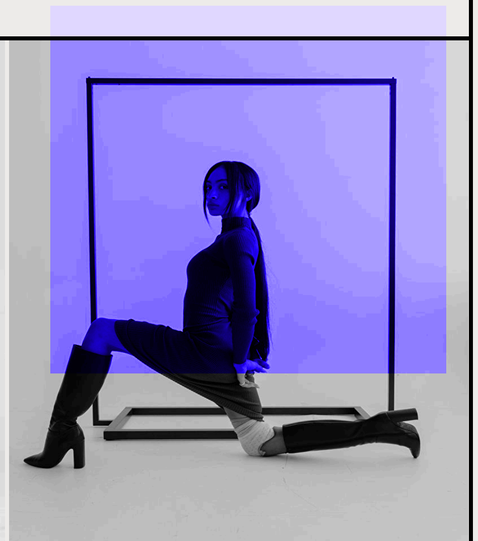
- SolidWorks – For CAD-ready technical modelling (based on confirmed measurements and internal circumferences)
- Adobe Illustrator/Photoshop/Substance – For designing surface aesthetics, textures, and patterns for personalisation
- Digital 3D Renders – To showcase customisation options visually
- 3D Printer – For producing the physical prototype for exhibition

Processes:

1. Dimension Preparation: Collect and confirm all limb measurements and internal circumference data.
2. Aesthetic Design: Apply personalised surface design (motifs, textures, colour schemes) using Adobe tools.
3. Visual Showcase: Render models digitally to communicate customisation and identity visually.
4. 3D Printing: Print the final prosthetic leg cover in campus, suitable for the university show.

BIBLIO*GRAPHY*





Empower. (n.d.). Ottobock. Retrieved 13 June 2025, from https://www.ottobock.com/en-gb/product/1A1-2-61113

Floral leg. (2020, August 26). The Alternative Limb Project. https://thealternativelimbproject.com/limbs/floral-leg/

Honigsbaum, M. (2013, June 15). The future of robotics: in a transhuman world, the disabled will be the ones without prosthetic limbs…. The Guardian. https://www.theguardian.com/technology/2013/jun/16/future-robotics-bionic-limbs-disabled

I-limb® mobile apps by Össur. Ossur.com. (n.d.). Ossur.com. Retrieved 13 June 2025, from https://www.ossur.com/en-us/professionals/apps/i-limb-mobile-apps

Kenion, C. (2022, December 29). ’90s Beauty Moment: Alexander McQueen’s No.13 show, with Paralympic athlete Aimee Mullins. Charisse Kenion. https://www.charissekenion.co/words/90s-beauty-moment-alexander-mcqueens-no13-show-with-paralympic-athlete-aimee-mullins/29/12/2022

Norman, D. A. (2013). The design of everyday things. MIT Press.

Pullin, G. (2011). Design Meets Disability. MIT Press.

Purdy, A. (2015). On my own two feet: From losing my legs to learning the dance of life. Blackstone Audiobooks.

Schillmeier, M. (2013). Rethinking disability: Bodies, senses, and things. Routledge.

Sharples, N. (n.d.). Prosthetic Technology and Patient Use. SAGE Publications.

UNYQ. (n.d.). UNYQ Design Europe S.L. Retrieved 9 June 2025, from https://unyq.com/