

# **CIRCLE OF INK**

**Immersive Tattoo Experiences with Personal Stories**



**"A tattoo is an affirmation: that this body is yours to have and to enjoy while you're here. Nobody else can control what you do with it."**

— *Don Ed Hardy*

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**“Circle of Ink” is an immersive, interactive installation exploring tattoo art’s rich history, cultural significance, and personal stories. Through projections, personal narratives, and hands-on activities, the project aims to create an engaging and informative space for people to learn about this topic. As tattoo popularity continues to rise, understanding their origins and significance is more important than ever. At the core of the installation is the symbolic round table; its circular form represents the infinite and continuous evolution of tattooing through the centuries. On this table are five distinct stations, each focusing on a specific aspect of tattoo culture. It includes the origins of tattooing with a focus on the 5,300-year-old Ötzi mummy, contemporary experiences of tattoo wearers through personal narratives, the future of tattooing through emerging technologies and trends, the traditions of Western tattooing with a particular focus on American Traditional style, and the elaborate art of Japanese Irezumi.**

**Visitors are encouraged to physically participate in the installation by resting their arms on armrests that resemble those used in tattoo studios. By doing so, visitors will trigger a button, activating the projection of tattoo designs onto their skin; at the same time, audio narratives will explore the stories and meaning behind each tattoo style. This fully immersive, multi-sensory experience will allow visitors to briefly experience getting a tattoo without the permanence and inform them in a personal and emotional way. It explores the extent to which personal narratives can provide a richer understanding of the meanings and motivations behind tattoos, as shared by both tattoo artists and wearers.**

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# INTRODUCTION



Tattoos have had deep cultural significance across civilizations for thousands of years, yet marking one's body indelibly with ink has often been stigmatized or misunderstood. Over the past few decades, tattooing has rapidly shed its fringed associations and gained widespread mainstream acceptance as a valid form of personal expression and artistry.

As this ancient practice is embraced by the mainstream, deep traditions, symbolism, and diverse cultural contexts that have shaped tattooing throughout human history must be comprehended and valued. From the iconic American Traditional style born of sailor culture (Naval History and Heritage Command, n.d.) to the intricate Japanese Irezumi techniques with roots in the Edo period (Skutlin, 2020), each tattoo style carries a unique origin, aesthetic motifs, and symbolic meanings.

However, for those without tattoos, the permanence and lifelong commitment inherent to this art form can make it difficult to truly grasp the deep personal connection developed between a person and their ink. This inability to experience tattoos firsthand without getting inked can lead to a barrier to truly appreciating their significance and tattoo culture in general.

It is this divide and the wish to give people, especially those without tattoos, a glimpse of the tattoo experience that led to the creation of "Circle of Ink". Users are invited to journey through the past, present, and potential future of tattooing. Personal narratives from tattoo artists and wearers are interwoven, which is the heart of my project. This project offers a projection installation, an immersive way to engage with the world of tattoo art. Allowing viewers to experience designs on their skin temporarily through a simulation, this installation attempts to nurture a deeper understanding and appreciation for tattoos as a form of expression.

The goal of this project is to educate people about the rich history of tattoo art and provide an experience through which people can connect with this art form on a personal level. Incorporating personal stories is one element that makes "Circle of Ink" resonate with people deeply and emotionally. The installation gives way to an interview with tattoo artists, collectors, and enthusiasts, therefore providing an intimate story, experience, and perspective toward this art. These stories give audiences insight into individuals' deeply personal and often transformational journeys because of their tattoos, evoking a sense of connection and understanding beyond merely an aesthetic appreciation. By emphasizing human stories behind the ink, the emotional resonance that "Circle of Ink" creates creates a personal and meaningful exploration of tattoo culture for all who encounter this installation. Giving especially untattooed visitors the opportunity to project tattoos onto their skin and experience how they feel additionally offers a novel approach to sensitize people to this permanent art form. "Circle of Ink" aims to create a new appreciation for the transformative power of ink on skin and the enduring human desire to adorn the body as a canvas of personal expression.

# MOTIVATION

As a tattoo artist, I am interested in the diverse world of tattoo culture. What started as a passion for art became more profound: a calling to share and celebrate the histories, traditions, and stories woven into this ancient art form.

However, as tattooing emerges into mainstream popularity, I have witnessed a disconnection between the appreciation for tattoos as artistic expressions and understanding the deeper well of meaning from which they arise. Additionally, people tend to collect tattoos without understanding the meaning of their permanence or the potential consequences emerging due to prevailing stigma associated with tattoos. I want people to understand what comes with tattoos and their meaningfulness.

Ultimately, I want to share my sense of awe and emotion from learning the tales behind the ink. I aspire to kindle similar sparks of wonder and appreciation in others by bringing tattoos to life through immersive storytelling. Tattoos are not just body adornments but powerful artifacts of humanity's creative journeys over time.

# RESEARCH

### **3.1 HISTORIC RESEARCH**

Examining tattoo history to understand where they come from, and their significance is essential.

#### **DEFINITION TATTOO**

Tattoos are a type of body modification in which ink, pigments, or dyes are inserted into the skin's dermis to produce a design, pattern, or symbol that is relatively permanent within the skin (Lodder 2010; Sanders & Vail 2008). Tattooing involves puncturing the skin with a needle to insert the ink into the dermis, thus creating a mark on the skin that remains visible for a lifetime.

#### **3.1.1 THE VERY FIRST TATTOO**

We cannot say when and where tattooing started exactly because of the incompleteness of body art's historical and archaeological records. However, the oldest direct evidence of this practice has been found on mummies worldwide, from Nubia to Peru. Among them is the Tyrolean Iceman, also known as "Ötzi" found in a glacier region in the Alps, dated back to 3300 B.C.E. (green book).

Ötzi has a total of 61 tattoos, which were located, according to Conrad Spindler, as follows: "Four groups of lines to the left of the lumbar spine; one group of lines to the right of the lumbar spine; a cruciform mark on the inside of the right knee; three groups of lines on the left calf; a small cruciform mark to the left of the left Achilles tendon; a group of lines on the back of the right foot; a group of lines next to the right outer ankle; a group of lines above the right inner ankle."

Although the exact reasons for these tattoos are still unknown and remain a subject of research among archaeologists and anthropologists, the precise locations of their groupings correspond to 80% of classical acupuncture points used for rheumatic treatments (Gilbert, 2000). It seems unlikely that Ötzi was the only tattooed person in his community. Still, without further evidence, we cannot know how widespread tattooing was at that time, nor to what degree this system of, likely, medical practice as tattooing was in general (Green, 2003).

**DEFINITION  
IREZUMI**

Irezumi is the Japanese word for tattoos. Throughout Japan's history, various terms have been used to describe tattoos, and "Irezumi" itself has been written with different characters, each carrying distinct meanings or nuances. It was used as a branding mark for punishment for criminals, while written with different Japanese characters it can also refer to tattoos done voluntarily (Ashcraft & Benny, 2016).

**DEFINITION  
UKIYO - E**

Ukiyo-e, which translates to "pictures of the floating world," refers to Japanese paintings and woodblock prints that originally portrayed the pleasure districts of cities during the Edo Period. This era was marked by a peaceful and tranquil existence under the rule of the Shoguns, who encouraged the enjoyment of life's sensual pleasures. These picturesque narratives not only document the leisure activities and atmosphere of the time but also showcase distinctly Japanese aesthetics of beauty, poetry, nature, spirituality, love, and sex (The Art Story, n.d.).

One of the most famous ukiyo-e artworks is "Under the Wave off Kanagawa" (also known as "The Great Wave") by artist Katsushika Hokusai. These prints, originating in the Edo period (1603-1868), hold a significant place in Japanese culture and have profoundly impacted various art forms worldwide. One such art form that has been heavily influenced by ukiyo-e is tattoo design (Park, 2023).

**DEFINITION  
YAKUZA**

Yakuza are Japanese gangsters and members of bōryokudan ("violence groups"), akin to Mafia-like criminal organizations. In Japan and the West, the term yakuza refers to both individual criminals and their organized groups, as well as Japanese organized crime as a whole. Yakuza adopt samurai-like rituals and often have intricate body tattoos. Their activities include extortion, blackmail, smuggling, prostitution, drug trafficking, gambling, loan sharking, and various business control in major Japanese cities. Globally, they also partake in criminal activities (Encyclopaedia Britannica, n.d.).

The term yakuza, meaning "good for nothing," originates from a losing hand in a Japanese card game (ya-ku-sa: eight-nine-three). The yakuza's origins are unclear but are thought to descend from rōnin (masterless samurai) who became bandits or village defenders, as well as grifters and gamblers from Japan's feudal period (1185-1603).

### 3.1.2 JAPANESE IREZUMI

Japanese tattooing has a long and storied history, woven into the cultural fabric across centuries. In its earliest origins, dating back to the Kofun period (250 AD - 600 AD), Japanese tattoos served as markers of criminality and punishment. This was mirrored in Ancient Rome, where slaves were known to be tattooed with mottos such as "I am a slave who has run away from his master (Zealand Tattoo, 2014). During the 7th century AD, the ruling powers adopted attitudes from China that viewed tattooing as a barbaric practice used to brand criminals and outcasts. Criminals were marked with a variety of symbols that usually drew attention to the place where the crime was committed. In one part of Japan, the pictograph for the word "dog" was tattooed onto the criminal's forehead. Other marks included bars, crosses, or circles on the face and arms in patterns (Gilbert, 2000). However, this ancient art experienced a renaissance in the Edo period (1603 - 1868). As the vibrant ukiyo-e woodblock print culture flourished, tattoo designs were heavily influenced by the iconic art style. Ukiyo-e woodblock printing originated to meet the rising demand for novel illustrations, theater advertisements, and images depicting the urban "floating world" (Wanczura, 2003).

Masters like Utagawa Kuniyoshi played a pivotal role in shaping the iconic aesthetic of Japanese tattooing. Kuniyoshi's masterful woodblock prints depicting heroic figures from folklore and history, adorned with elaborate full-body tattoos, became the blueprint for the Traditional Irezumi style. Tattooists then adapted these illustrations into wearable body art. From the mid-18th century onwards, Irezumi evolved into an underground celebration of courage, endurance, and lifelong loyalty among groups like firemen, laborers, and the anti-establishment yakuza gangs.

The 14th-century Chinese novel *Suikoden*, about defiant outlaws adorned in extensive tattoos, further fueled Irezumi's popularity as resistance against the oppressive Tokugawa shogunate. Paradoxically, as this tattoo renaissance peaked in the early 19th century, the regime outlawed it around 1720, deeming it "deleterious to public morals" due to its links to criminal subcultures.

The opening of Japan in the 1850s brought Western influences, with master Irezumi artists legally inking European visitors while Japanese clients remained prohibited. As the Meiji era began in 1868, the new government again stigmatized this consecrated art as antiquated. However, Irezumi's transcendent traditions persisted, maintaining its integrity as a symbol of the indomitable human spirit (Gilbert, 2000).

### 3.1.3 THE ANCIENT ART OF POLYNESIAN TATTOOING

Tattooing held profound cultural and spiritual significance throughout the islands of Polynesia long before European explorers arrived. This ancient art form originated with the Lapita peoples, who inhabited Melanesia and western Polynesia thousands of years ago. Archaeological evidence shows tattooing implements and pottery decorated with designs strikingly similar to traditional Polynesian tattoos dating back over 3'000 years (Deter-Wolf, 2021).

The legendary origins of Polynesian tattooing involve two female Fijian tattooist voyagers who brought the practice to Tonga and Samoa. The people of Tonga and Samoa unintentionally established the tradition of tattooing men due to misadventures that caused them to mix up the original chants, stating, "Only women are tattooed." In Tonga and Samoa, tattooing evolved into a highly refined sacred ritual. Warriors and priests covered their bodies in elaborate geometric designs imbued with profound social, spiritual, and cultural meaning (Gilbert, 2000).

As Polynesian peoples spread across the Pacific islands from around 200 to 1000 AD, distinctive tattooing styles emerged in each region while still bearing similarities to the ancient designs. The Marquesan tattoos were among the most complex, sometimes covering the entire body with intricate patterns unique to their island culture. Tattooing tools, techniques, and practices developed sophistication over the centuries.

However, this long-established art form nearly died out due to the opposition of European missionaries and colonial regimes in the 17th-19th centuries who viewed it as associated with native pagan rituals. Paradoxically, as Polynesian tattooing was being suppressed, it emerged as a popular fad among European sailors after encountering tattoo artists during the voyages of explorers like Captain Cook. Tattooing is one of the few indigenous Polynesian art forms widely adopted by Western society, originating the modern tattoo traditions we know today (Gilbert, 2000).



### 3.1.4 THE BOLD BEGINNINGS OF AMERICAN TRADITIONAL TATTOOING

In the era of sailing ships and military conflicts, an iconic tattoo tradition was taking shape on the bodies of American sailors and soldiers. These adventurous souls returning home from the high seas and battlefields with permanent mementos inked into their skin - talismans of courage, patriotism, and longing for loved ones left behind. The distinctive American Traditional tattoo style would emerge from these humble origins.

The earliest professional American tattooists, like C.H. Fellowes, commemorated historic naval victories through their ingenious compositions. Fellowes' design books from the 1800s contain ambitious renderings of battles like the fiery clash between the warships "Kearsarge" and "Alabama" during the Civil War. Such patriotic maritime images would become beloved design staples as tattooing spread among the naval ranks.

As the 19th century continued, tattoo artists followed the military encampments across a nation rebuilding itself after the Civil War. The German immigrant Martin Hildebrandt was among the first to establish a permanent New York City studio after plying his craft amongst Civil War soldiers. During the war times, tattoo artist Martin Hildebrandt stated, "I have never had a moment of idle time. I marked thousands of sailors and soldiers, put the names of hundreds of soldiers on their arms or breasts. Also, many were recognized by these marks after being killed or wounded" (Brick Store Museum, 2023). His student Samuel O'Reilly would revolutionize the industry by patenting the first electric tattoo machine in 1891, allowing for exponentially faster inking.

During this pivotal transition, creative innovators elevated American tattooing into a distinctive art form. Former commercial artist Lew Alberts redefined iconic imagery, translating ubiquitous hearts, roses, eagles and anchors into designs ideally suited for bold tattoo art through his prolific talents. However, the legendary Charlie Wagner synthesized these into a coherent aesthetic.

Charlie Wagner's major contributions include the development and patenting of the first tattoo machine with vertical coils aligned with the tube assembly, a design that remains the standard for most tattoo machines used today (Black Widow Tattoo, 2021). For over six decades, spanning the electric tattooing revolution, Wagner's mastery produced full-body suits, extensive tattoos, usually of a similar pattern, style, or theme that cover the entire torso or the entire body, that stunned circus audiences and high society alike. His bold outlines and sweeping compositions unified traditional motifs into museum-worthy masterpieces on living canvases. Though overlooked by the art establishment, Wagner's unique vision became the

### 3.1.5 THE STIGMA OF INK: TATTOOING IN 19TH CENTURY FRANCE

In 19th-century France, tattooing was primarily associated with the criminal underclass, sailors and manual laborers. The educated upper echelons of French society viewed the practice with disdain, considering it a barbaric relic beneath their dignity. This stigma was reinforced by the disapproval of the influential Catholic Church, which opposed tattooing on the grounds of its pagan and superstitious origins (Gilbert, 2000).

The medical establishment further entrenched these negative perceptions. As early as the 1830s, physicians began publishing alarming reports of severe infections and even deaths caused by unsanitary tattooing practices. The transmission of syphilis through contaminated needles was documented, stoking fears about the dangers lurking in tattoo ink.

Pioneering dermatologist Ernest Berchon's award-winning 1861 paper on the medical complications of tattooing galvanized the French government into action. Tattooing was swiftly banned in the Navy and Army, driving the practice underground. Berchon hoped his research exposing the health risks would be sufficient to make the irrationality of "uncivilized custom" apparent to all, though he doubted a total prohibition was feasible (Roe, 2019).

The link between tattooing and criminality was firmly cemented in the public imagination by the work of Italian psychiatrist Cesare Lombroso. His influential 1876 book "Criminal Man" proposed that lawbreakers represented a primitive throwback identifiable by physical markers - including tattoos. By categorizing examples like penis tattoos or coded messages as sure signs of moral depravity, Lombroso reinforced the notion that "only outlaws will have tattoos" (Gilbert, 2000).

This perception was codified in French prison regulations from 1808, mandating the recording of convicts' tattoos for identification. Dr. Alexander Lacassagne's 1881 study analyzing thousands of these designs revealed popular motifs expressing vengeance, misfortune, and hostility to authority. Such tattoos were seen as physical manifestations of a criminal's base nature.

However, despite the stigma, allusions to tattooing still permeated French popular culture. In literature by luminaries like Beaumarchais and Victor Hugo, tattoos often served as crucial plot devices to establish a character's identity - suggesting a lingering fascination with the practice and its permanence even as it was disparaged.

So, while denigrated by polite society, medicine and criminology, tattooing's enduring presence in the French imagination hinted at its subversive power. The stories etched in ink on society's outcasts continued to captivate, foreshadowing the eventual revolution in attitudes to this marginalized art form.

### **3.1.6 TATTOO REMOVAL**

Many individuals feel embarrassed or ashamed of their tattoos because of negative societal perceptions, which can impact their personal and professional lives (Ojeda et al., 2022). This stigma can lead to social and professional pressures to conform to more traditional appearance standards, prompting individuals to seek tattoo removal to avoid judgment or discrimination. Other reasons for tattoo removal include aesthetic dissatisfaction, changes in personal circumstances, and influence from family or partners (Latreille et al., 2010). According to Kluger (2015), "Regardless of the origin of the reason for getting tattoos, some individuals will ultimately decide to have one of their tattoos removed."

### **3.2 RECENT RENAISSANCE OF TATTOOING**

With tattoos being associated with rebellion and counterculture for a long time, there has been a considerable shift in cultural perceptions towards tattoos in recent years (Lim et al., 2013). The population getting tattoos has increased tremendously over the years. According to a 2023 report from the Pew Research Center, 41% of adults under 30 and 46% aged 30 to 49 have at least one tattoo. This shows a huge increase over the preceding decades. For example, according to an Ipsos poll, Americans with at least one tattoo increased from 21% in 2012 to 30% by 2019. It is of major importance to understand the motivations towards getting a tattoo for insight into reasons for body modification and to help in creating a society that erases the negative stigmatization of body modification.

#### **3.2.1 THE ART OF SELF-EXPRESSION: TATTOOS AS CANVAS FOR IDENTITY**

The desire to get a unique piece of art permanently etched onto one's skin is one of the primary motivations for getting tattooed. In contrast to other art forms, tattoos are a unique work of art that becomes integrated into the individual, reminding them of experiences, emotions and ideas they developed (Kosut, 2000). According to Hardy and Selvin (2013), "Tattoos are a way of connecting with something that has meaning for you, that has power for you, and that you want to carry with you forever" (p. 23). An individual chooses a specific design or image through which he can express his creativity, or they may feel the urge to have that work of art on their skin because it holds some special meaning to them, which they would want to carry with them all their life.

### **3.2.2 RECLAIMING THE BODY: TATTOOS AS A MEANS OF EMPOWERMENT AND HEALING**

From a psychoanalytical perspective, tattoos can be seen as a way of reclaiming one's body after trauma. This process involves inscribing the body with marks that help deal with unconscious anxieties and conflicts, thereby enabling the self to regain consistency and circulate in society (Macedo, S. (2021)).

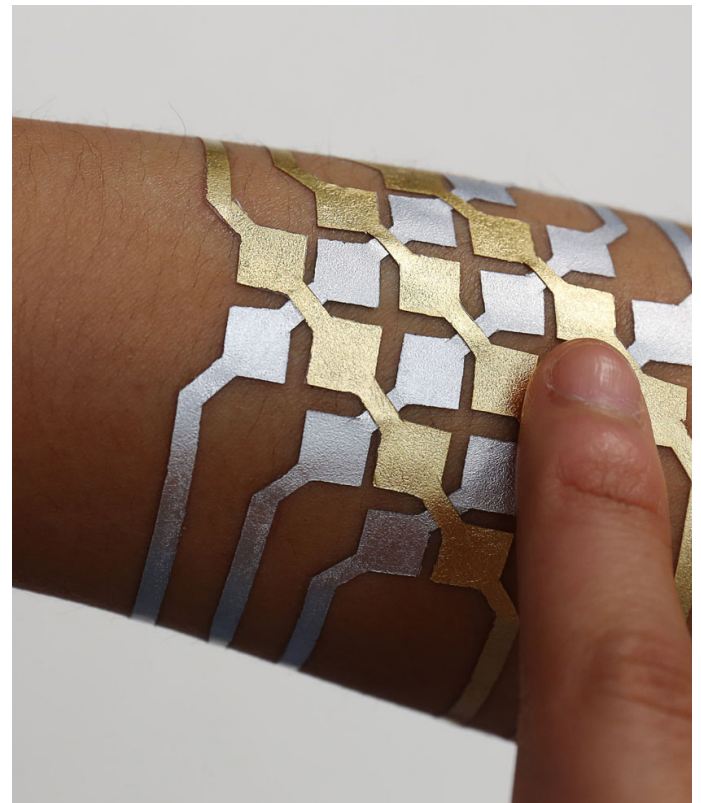
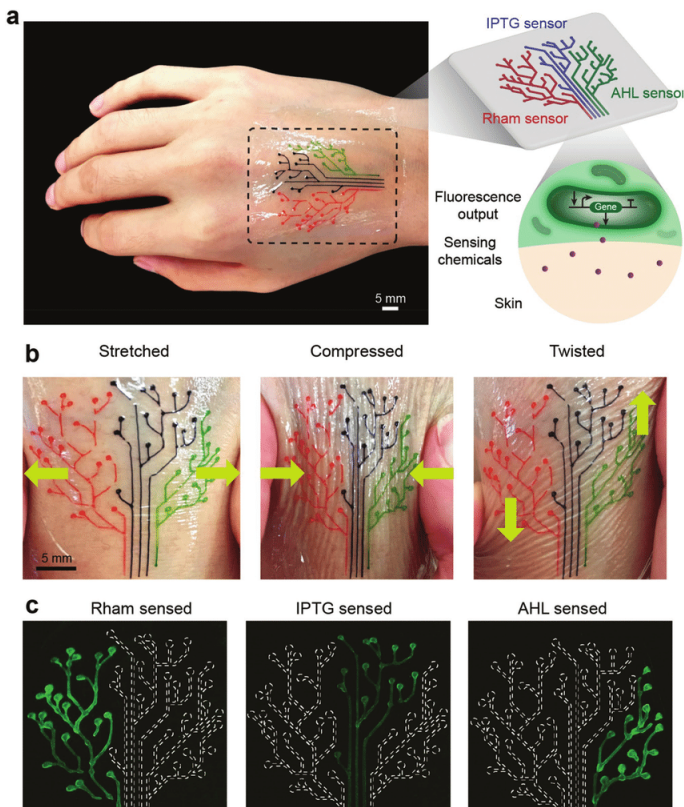
According to Macedo (2021), "Tattooing the body may be a way of writing those changes on the body itself, reclaiming the subject's ownership upon it, (re)libidinizing and (re)constituting its borders by marking the flesh and discursivizing it" (p. 42).

### **3.3 OUTLOOK**

As tattoo art continues to evolve and gain mainstream acceptance, it is fascinating to consider how emerging technologies and innovative approaches may shape the future of this ancient practice. From advancements in tattoo equipment and inks to the integration of tattoos into digital realms, the possibilities for pushing the boundaries of this art form are vast and exciting.

#### **3.3.1 BIO-INKS**

Bio-inks are a cutting-edge development in tissue engineering that could be adapted for tattooing. These inks comprise living cells and biomaterials that can be printed onto the skin using specialized 3D printers (Zhang et al., 2019). MIT engineers have developed a 3D printing technique using genetically programmed living cells as ink, capable of forming interactive structures. The cells, engineered to respond to various stimuli, are mixed with hydrogel and nutrients to create a printable material. By choosing bacterial cells for their resilience and compatibility with hydrogels, they achieved high-resolution prints with a custom-built 3-D printer (Liu et al., 2018). Demonstrating their method, they printed a "living tattoo" that lights up in response to specific chemicals on the skin. This "tattoo" resembles a sticker and can be removed again. With this novel technique, the team led by Xuanhe Zhao and Timothy Lu aims to create wearable sensors and interactive displays that can detect environmental changes. This technology holds potential for applications in wearable devices, drug delivery, and medical implants, and it is supported by institutions like the Office of Naval Research and the National Science Foundation (Chu, 2017). Thus, bio-inks could allow for visually stunning tattoos and functionally interact with the body—think of a tattoo that changes color in response to changes in the wearer's health or emotions. For example, DuoSkin is one medical application that already exists for bio-inks. This rapid prototyping and fabrication process using gold leaf, a skin-friendly material, to create wearable on-skin user interfaces, such as sensing touch input (left), displaying the mood of the user with a thermochromic tattoo (center), and communicating and sharing data with other devices through near field communication (NFC) technology. It can take up the shape of intelligent tattoos that feel, display dynamic information, and communicate with other devices wirelessly. This technology retains conventional tattoos' aesthetic appeal while including innovative functionalities (Kao et al., 2016). Users could personalize their smart tattoos to reflect personal aesthetics and functionalities.



1, 3D-printed living tattoo for chemical detection on human skin  
[https://www.researchgate.net/figure/3D-printed-living-tattoo-for-chemical-detection-on-human-skin-a-The-design-of-the\\_fig4\\_322646073](https://www.researchgate.net/figure/3D-printed-living-tattoo-for-chemical-detection-on-human-skin-a-The-design-of-the_fig4_322646073)

2, DuoSkin on-skin user interfaces  
<https://duoskin.media.mit.edu/>

### 3.3.2 TATTOOS AS MEDICAL TOOLS

Due to their many promising applications, there is a fast-growing interest in the potential medical uses of tattoos. Scientists are exploring various ways tattoos could serve as medical tools. One application involves biosensors, which analyze interstitial fluid in the skin to monitor a wide array of health metrics (Kim et al., 2021). Additionally, tattoos could revolutionize drug and vaccine delivery through minimally invasive methods (Choi et al., 2020). Medical tattoos hold potential for detecting changes in biomarkers, glucose levels, and other vital signs, providing early alerts to both users and healthcare professionals. By integrating health monitoring into body art, medical tattoos could pave the way for personalized medicine, improved management of chronic diseases, and real-time health monitoring.

### **3.2.3 SEMI- PERMANENT TATTOOS**

Another area of speculative research involves envisioning new forms of temporary or removable tattoo artworks. While the permanence of tattoos is often seen as a key part of their appeal, there is also a growing interest in exploring tattoos designed to be temporary or easily removed. This could involve the development of new inks that naturally fade over time or the utilization of advanced laser technologies that allow for the precise and painless removal of tattoos (Baranska et al., 2018). Such advancements could open up new possibilities for individuals who want to experiment with tattoos without long-term commitment or change them to reflect their evolving identities and experiences. However, this could lead to less thoughtful consideration of getting a tattoo. More people could get tattoos just for the sake of it, potentially diminishing the cultural and personal significance traditionally associated with the decision to get a tattoo. The ease and reversibility might trivialize the process, making tattoos more of a casual fashion accessory rather than a deeply meaningful or permanent form of self-expression. This shift could impact the traditional value placed on tattoos and alter the way they are perceived in society, potentially reducing the depth of personal and cultural narratives often embedded in the art of tattooing.

### **3.3.4 TATTOOS IN DIGITAL REALMS**

With the rise of augmented reality (AR) and virtual reality (VR) technologies, it is possible to envision a future where tattoos can be experienced and interacted with in entirely new ways. For example, AR tattoos could allow individuals to animate or enhance tattoos using digital overlays, creating dynamic and interactive body art that blends the physical and virtual worlds (Javornik et al., 2017). VR tattoos, on the other hand, could enable individuals to experiment with tattoo designs in fully immersive digital environments, allowing them to see how different tattoos would look on their bodies without any physical commitment (Punpongsanon et al., 2020) and without experiencing the pain of getting tattooed.

# CONCEPT

My project aims to be an interactive installation that educates and immerses visitors in the rich history, cultural significance, and personal narratives behind tattoo art. This project's main target is both tattooed and non-tattooed people, as well as individuals interested in the art and its different dimensions. My project aims to close the gap between tattooed and non-tattooed people to achieve a deeper understanding and respect for the art form through its interactivity and engagement of multiple senses. Overall, the project aims to offer an informative but entertaining platform with which visitors may get engaged on a personal level with tattoo art in a way that inspires a new appreciation of the transformative power of tattoos and the part they play in human expression.

The installation's design and content will be refined throughout the process to ensure an impactful and meaningful experience for visitors.

#### **4.1 RESEARCH QUESTION**

“Why do people get tattoos, and what are the rich cultural and historical backgrounds behind this ancient practice?»

The profound motivations and meanings that drive individual people to mark their skin with ink permanently are explored in this question. These ancient traditions, symbolism, and cultural contexts have fashioned tattooing in human history from its most ancient origins to its modern manifestations. By exploring the varied reasons people have chosen to get tattooed—from personal expression and identity formation to spiritual and social significance—this question sheds light on the enduring allure and power of tattoo art.

“How do personal narratives from tattoo artists and wearers contribute to a more comprehensive understanding of the significance and meaning behind tattoos?”

Tattoos are a deeply personal form of expression. People familiar with this art form, especially those with tattoos and tattoo artists, can share their experiences meaningfully. Their stories provide valuable insights into the significance of tattoos, which could help those without tattoos understand the profound importance these markings can hold for individuals. These personal narratives could reveal the emotional, cultural and personal layers behind each tattoo, highlighting how tattoos can symbolize identity, memories and personal journeys.

“How can the entire experience of having tattoos, with all its profound personal, cultural, and historical dimensions, be effectively conveyed to non-tattooed individuals through an immersive, interactive installation?”



This question is at the center of my project, which attempts to bridge the informational gap in understanding and appreciation between the tattooed and non-tattooed. It challenges our belief in how the power of interactive design, storytelling, and technology can be tapped to create an immersive experience, allowing, especially people without tattoos, to understand what having a tattoo could feel like without undergoing the tattooing aspect. As an individual with a deep interest in tattoo culture and a desire to promote greater understanding and appreciation for this art form, I can contribute to bridging the gap between those with and without tattoos in several ways.

## **4.2 RELATED WORKS**

The related works included in this section have been chosen for their innovative approaches to presenting information in engaging and interactive ways. This aligns with one of the primary goals of my project, "Circle of Ink," which aims to provide an immersive and educational experience about tattoo culture through projection mapping and interactive storytelling.

### **4.2.1 SKIN-ON**

Skin-On is a project initiated by Marc Teyssier that aims to make human-computer interaction as natural as possible by imitating the human skin. The idea behind Skin-On is to give modern devices an additional layer of synthetic skin so that their interaction will be more natural and intuitive. Human skin is believed to be the best interface for interaction; thus, the Skin-On project seeks to reproduce its properties and improve the user's experience.

Skin-on interfaces can better imitate the tactile sensations of interactions with objects by covering surfaces with a skinny layer of artificial skin. This project examines different applications where this technology could be utilized, including touch-sensitive surfaces, wearable devices and even robots. The purpose is to develop a more realistic and easily understood interface that incorporates the element of touch in our dealings with technology.

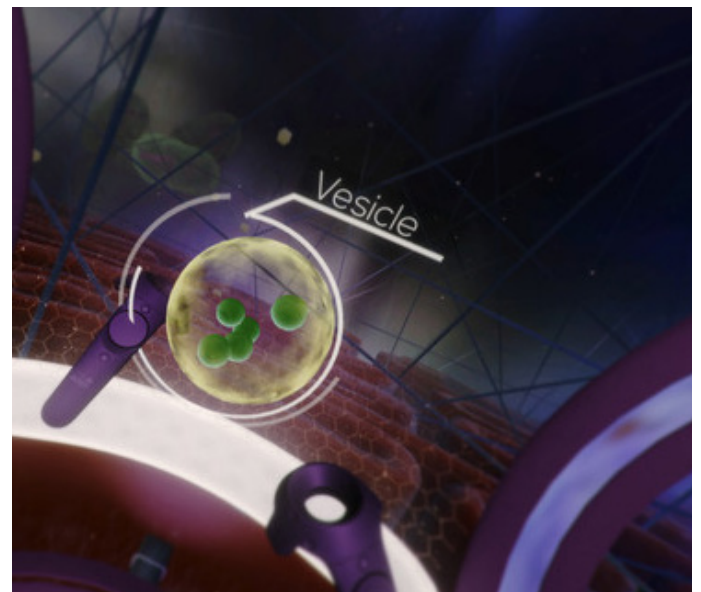
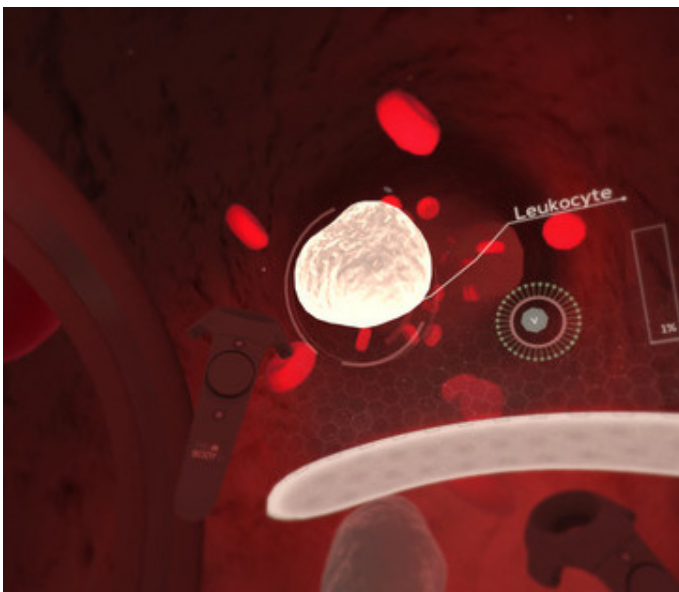


4, Marc Teyssier. (2019.) *Skin-On Interfaces*. <https://marcteyssier.com/projects/skin-on/>

5, Marc Teyssier. (2019.) *Skin-On Interfaces*. <https://marcteyssier.com/projects/skin-on/>

#### 4.2.2 THE BODY VR: A JOURNEY INSIDE A CELL

The Body VR, created by The Body VR, is an educational virtual reality game designed to provide an immersive experience by taking users on a virtual journey inside the human body. It offers a unique perspective on the inner workings of cells and allows players to learn about the human body interactively and engagingly.



6, The Body VR LLC. (2016). *The Body VR: Journey Inside a Cell*. [https://store.steampowered.com/app/451980/The\\_Body\\_VR\\_Journey\\_Inside\\_a\\_Cell/](https://store.steampowered.com/app/451980/The_Body_VR_Journey_Inside_a_Cell/)

7, The Body VR LLC. (2016). *The Body VR: Journey Inside a Cell*. [https://store.steampowered.com/app/451980/The\\_Body\\_VR\\_Journey\\_Inside\\_a\\_Cell/](https://store.steampowered.com/app/451980/The_Body_VR_Journey_Inside_a_Cell/)

### 4.2.3 THE YEAR OF GRETA

The interface of "The Year of Greta" is special because it is visually engaging and highly interactive. It uses a clean, modern design with intuitive navigation, allowing users to easily explore different sections about Greta Thunberg's activism. The website features multimedia elements such as videos, images, and timelines, which provide an immersive experience. The design emphasizes readability and user engagement, making it easy to access detailed information about Greta's journey and impact on the climate movement.



8, Superhero Cheesecake. (2019). The Year of Greta.

<https://theyearofgreta.com/>

9, Superhero Cheesecake. (2019). The Year of Greta.

<https://theyearofgreta.com/>

### 4.2.4 PARTED - BODY TRACKING & PROJECTION MAPPING

Parted is a collaboration between Daisuke Hashimoto, Paul Lacroix, and Yae Doi, starring artist Mari Katayama. It is a live body projection piece depicting the journey of an unconventional substance as it crawls, erodes and evolves within a woman's body. This metaphorical narrative symbolizes the complexities and inconsistencies stemming from physical imperfections. Using an infrared camera, the system tracks multiple reflective markers placed on the skin. They guide the real-time deformation of a CG model and make it fit the body's shape. I like that the projection plays in between the real world but still feels virtual due to the uniqueness of the substance. It is part of the woman's skin, just like a tattoo.



10, Paul Lacroix, Daisuke Hashimoto, Yae Doi. (2022). Parted - Body Tracking & Projection Mapping  
<http://parted.tokyo/>

11, Paul Lacroix, Daisuke Hashimoto, Yae Doi. (2022). Parted - Body Tracking & Projection Mapping  
<http://parted.tokyo/>

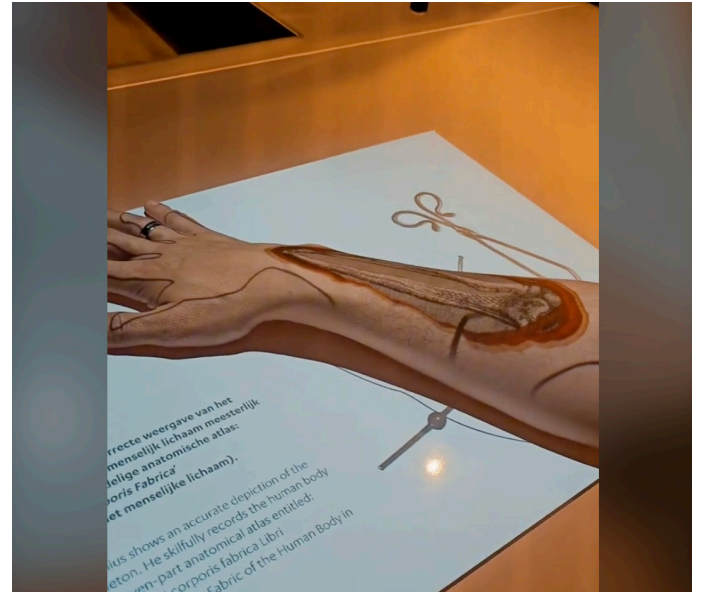
#### 4.2.5 DISCOVER THE WORLD OF SCIENCE - SILO

The “Discover the World of Science” project at the Museum Rijksmuseum Boerhaave in the Netherlands offers a fascinating example of how projections can create immersive educational experiences. This clever installation allows users to explore what an arm operation could look like without actually cutting the body open. The use of projection technology to simulate surgical procedures provides a safe and engaging way for visitors to learn about medical science without any physical risk.

A spoiler about my project: I found many similarities of this project to my work, “Circle of Ink,” as it demonstrates the potential of using projections to simulate experiences—in my case, tattoos—without the commitment or pain associated with the real thing. A friend shared this project with me via LinkedIn because it reminded them of my work. Although I was unaware of this project before beginning mine, I find the parallels intriguing and validating. Notably, the “Discover the World of Science” project was created on May 10, 2013, and the LinkedIn post discussing it was published in April 2024.

#### 4.3 METHODOLOGY

This thesis will employ a multi-method approach that combines qualitative research, artistic creation, and public engagement to address the research questions and contribute to a more comprehensive understanding of tattoo culture and its significance.



11, Silo. (n.d.). Rijksmuseum Boerhaave.  
<https://silo.nl/work/rijksmuseum-boerhaave>

12, Screenshot of a LinkedIn Post from Rijksmuseum Boerhaave  
<https://www.linkedin.com/feed/update/urn:li:activity:7188789052492419072/>

#### 4.3.1 HISTORICAL AND CULTURAL RESEARCH

The literature review and analysis of the history and cultural significance of tattooing in the many civilizations and periods would form the first phase of the investigation, which I discussed in the research section (see above). This includes an analysis through academic sources, archival materials and visual documentation of the origins, evolution and symbolic meanings of different styles and traditions of tattoos. Particular attention will be given to the Western Traditional and Japanese irezumi tattoo styles. This research will provide a foundation for the artistic creation and inform the design of the immersive installation.

#### 4.3.2 INTERVIEWS AND PERSONAL NARRATIVES

Face-to-face, semi-structured interviews will be conducted with participants from different backgrounds to obtain personal tattooing experiences by tattoo artists and wearers. The interviews will cover areas such as the driving force behind the decision to get tattooed, the creative process, the personal and cultural meanings that individuals attach to certain designs and the challenges and rewards of being a part of the tattoo community. Depending on the direction and format that emerges during the creative process, such interviews will be analyzed and possibly integrated into the final product.

#### 4.3.3 USER ENGAGEMENT AND FEEDBACK

User testing will also be arranged for the final installation, which could develop its impact and effectiveness and promote understanding and appreciation of tattoo culture. Since it is the final product, visitors will be allowed to use the installation, interact with the work, and give feedback on what might be included in the piece.

# Project Development

## **5.1 TESTING AND PROTOTYPING**

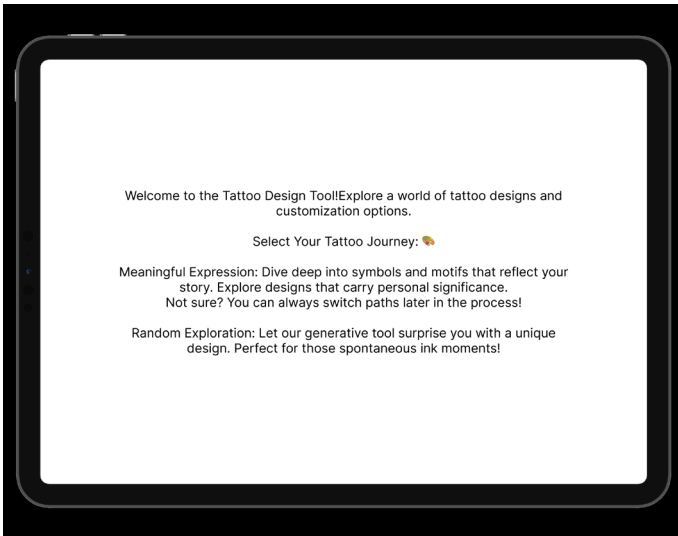
### **5.1.1 THE GENERATIVE TATTOO DESIGNER**

Choosing the design plays a pivotal role in getting a tattoo, so I wanted to find out if I could assist with this aspect of my installation. Due to the permanence of a tattoo, this task can be quite daunting. In the initial stages of user testing, I focused on integrating tools to aid the decision-making process for individuals considering getting tattoos.

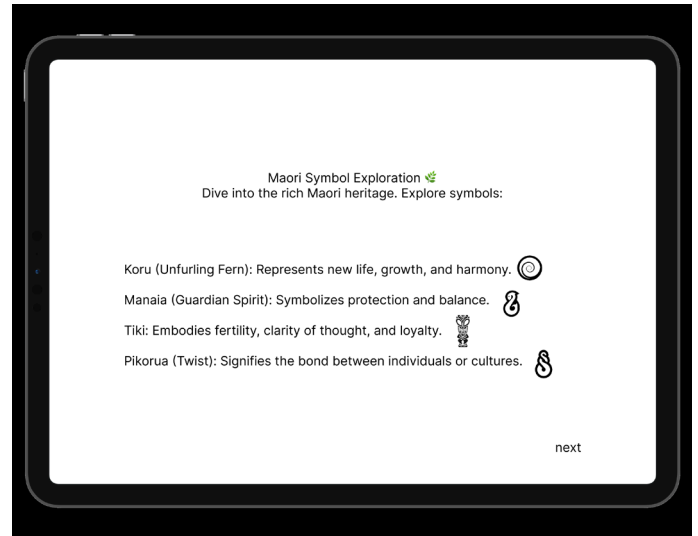
The aim was also to give users a general understanding of the meaning of cultural and symbolic tattoos. To do this, I created a prototype of a questionnaire-based tattoo design tool with Figma. The prototype allowed users to generate random, meaningful tattoos by integrating narratives, sketches and symbols.

The prototype also allows users to learn about tattoo symbols from different cultural practices, such as Maori tattoo symbols. The user was also able to generate a random design or infuse more meaning by adding keywords or meanings or even drawing something. On the other hand, a picture generator from ChatGPT was applied to evaluate the questionnaire data and represent various types of tattoos.

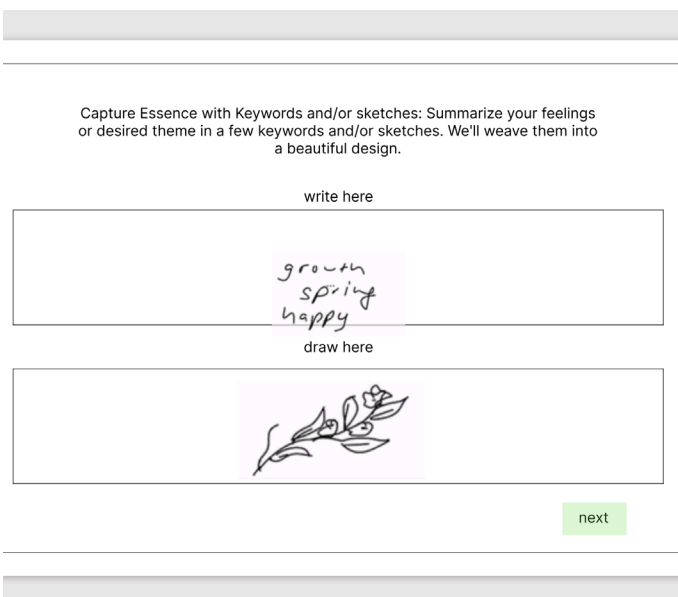
Lili Arn, the stakeholder, enjoyed the process and indicated that she loved how easily the questionnaire generated the designs. To her, it was a platform for creative exploration, creating unconventional options for creating different designs through narrating stories and drawing personal symbols. Exploring different symbols was the most exciting part for Lili, but she recommended dividing the exploration from the questionnaire separately. She thinks that the tool can be helpful for people who are undecided about their tattoo design, but she is unsure if the tool can be the final resolution for the problem. However, her desire to further investigate sparked up again, when I gave her a brief selection of different symbols with the knowledge that behind every symbol is an underlying meaning. This statement validates that people's interest can be raised, when you provide them with information improving their understanding of the topic.



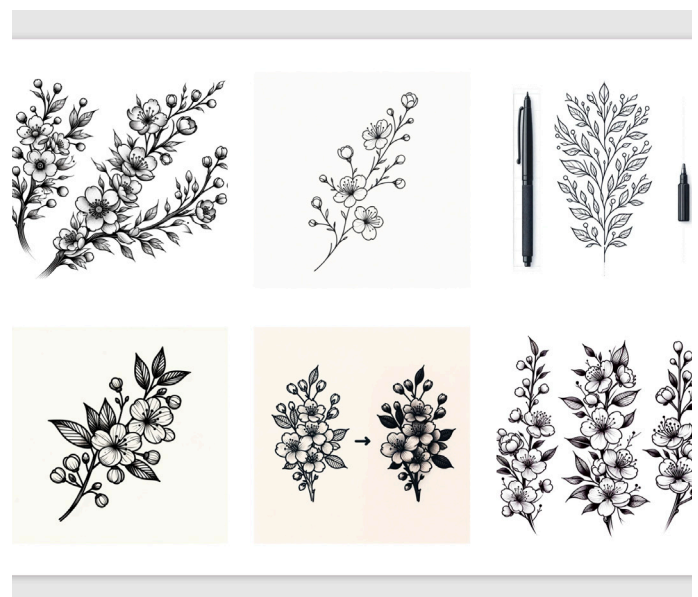
11, Screenshot of the Questionnaire of The Generated Tattoo Designer, Welcome Page



12, Screenshot of the Questionnaire of The Generated Tattoo Designer, Maori Symbol Exploration



13, Screenshot of the Questionnaire of The Generated Tattoo Designer, Capturing Keywords and Drawings from Lilli



14, Screenshot of the Generated Designs of The Generated Tattoo Designer by ChatGPT



### 5.1.2 TATTOO SIMULATOR

In this part of the testing, I intended to demonstrate how the tattoo design will look on different body parts and give the visitor a quick review of the look in real time by creating a tattoo simulator that projects tattoos on people's skin. With this simulator, users can decide on their preferred size and placement of the design by seeing it directly on their own body. I want to find out whether the simulation sparks interest in people.

### 5.1.3 PROCREATE

In Procreate's drawing application, artists can redesign their motifs by projecting them onto their intended placement. In this way, the problem is 2D, its application. The 2D motif applied to a picture of the therefore 2D body part is not an optimal simulation for the body because it is missing the third dimension. Procreate can be an excellent instrument for tattoo designers to draw the scene of the tattoos and approximate their size and location, but it is not the ideal tool to see how a tattoo would look on the body in real life. Many tattoo artists, myself included, use Procreate the design part, but for a simulated-realistic approach, as I wanted to create in my installation, it is not the best tool.



15, Screenshot of using Procreate for a tattoo customer



16, Screenshot of using Procreate for a tattoo customer

#### 5.1.4 FILTERS

In the previous testing, I worked with filters that recognize the body as a 3D object to overcome the above-described issue of projecting a 2D onto a 3D body, the third dimension. Meta Spark provides a great variety of face filters, which you can easily use in a few seconds. However, selecting a body part other than a face becomes difficult because the body has a much larger surface than the face and fewer anchor points. On the contrary, the face has unmistakable traits: the eyes, the nose, and the mouth. However, adding filters to the arms, legs or other body parts would be more complicated. Lens Studio AR, a tool by Snapchat, allows the creation of entire clothing filters, which may be tweaked to fit tattoos as they are similar to clothing that spreads around the body. However, from my point of view, this method cannot be considered successful, as it does not look natural and does not create the feel of a 3D image.

#### 5.1.5 ANALOG TEMPORARY TATTOO VISUALIZATION

Tattoos are permanent, and some individuals worry they might regret their decision in the future. To avoid that feeling of regret and feel certain before getting tattooed, I tried out methods for analog temporary tattoos. An analog approach could give off the most realistic feeling on one's skin instead of seeing it digitally.

A friend of mine, Sharon Amatruda, was considering getting a tattoo by her. I suggested that she draw her desired design onto her body with henna before she made a final decision. She mentioned that she had applied this method on many occasions and was sure it was the best way to come to terms with her decision.

At the tattoo session, her plus one, Marah Ruepp, also took advantage of scanning through my so-called wanna-dos, a collection of tattoo designs I would like to work on sometime soon. She pinpointed one she wanted but was not confident to get it as she only had small tattoos. I assisted Marah by offering her a stencil of her selected design and how to apply it to her body. Tattoo stencils are usually used in the tattooing process to transfer the design onto the skin to guide the tattooist. To use it beforehand as a guiding way to make the decision is quite novel. Marah was really thankful for this opportunity, as she is indecisive, especially when it comes to something as permanent as a tattoo. By wearing the tattoo stencil on her body for several days, Marah could gain a realistic understanding of how the tattoo would look and feel in everyday life.

Interestingly, Marah noted that her opinions about the aesthetic appeal of the chosen tattoo design evolved over time as she wore the stencil. This experience provided her with valuable insights and allowed her to consider her decision thoroughly. Although she still required ample time to reflect on the tattoo, Marah found the overall experience extremely beneficial in helping her make an informed choice.

Although simple, methods for analog temporary tattoos, like using a stencil, are not used much in the tattoo community, even though the resources are readily available. One reason is to avoid misusing the tattoo stencils or even considering such an idea. Additionally, these tattoo stencils are often dark blue, which can transfer onto the skin.



17, *Tattoo Stencil on  
Marah*

### 5.1.3 PROCREATE

In Procreate's drawing application, artists can redesign their motifs by projecting them onto their intended placement. In this way, the problem is 2D, its application. The 2D motif applied to a picture of the therefore 2D body part is not an optimal simulation for the body because it is missing the third dimension. Procreate can be an excellent instrument for tattoo designers to draw the scene of the tattoos and approximate their size and location, but it is not the ideal tool to see how a tattoo would look on the body in real life. Many tattoo artists, myself included, use Procreate the design part, but for a simulated-realistic approach, as I wanted to create in my installation, it is not the best tool.

### 5.1.6 PROJECTED TATTOOS PART ONE

Recognizing that experiencing simulations on one's skin in real life is the most captivating approach for people, I aimed to capture that idea and find a way to realize it in an immersive manner. What if I did not limit myself to analog or digital methods but combined them? In my next experiment, I used projections to display tattoo designs directly onto the skin.

The prototype had a ceiling-mounted projector, which projected tattoo images from three different tattoo cultures: Maori (New Zealand), Sak Yant (Southeast Asia, particularly Thailand), and traditional American, or "old school," sailor tattoos. The Maori tattoo style was selected because it is well-recognized and represents ancient, intricate body art with unique geometric shapes and full-body designs. Born in Thailand but raised in Switzerland, I included Sak Yant tattoos in this case, as these tattoos have become more commercialized as a tourist activity. I chose Sak Yant tattoos, and their ritual and spiritual characteristics sparked my interest. The old-school sailor tattoo style was included as its designs remain very popular, and many tattoo artists include them in their artwork despite not specializing in them. I want to awaken interest in these different tattoo styles by providing varieties.

Firstly, the projected tattoo designs were displayed on a tattooing armrest, in which participants, two classmates of mine, were allowed to rest their arms on the surface and observe the simulated tattoos. However, as the testing progressed, they became increasingly interested in exploring the projections with their bodies by standing, so the table was removed, making it much harder to position their arms in the designated area. Still, it led to a more exploratory and embodied experience. The users began to find creative ways to put tattoo designs on their body parts, focusing on the arm and trying out new body parts that could be illuminated, such as legs and torsos.

I brought this prototype into the progress session, during which I gained more feedback. They found it quite fun and the projected tattoo designs seemed quite realistic, even on curved body parts, since they smoothly adapted to the participant's movements. Still, other people were having difficulty with the orientation and placement of the projections since they sometimes stood with shadows beneath them, making it difficult to see them.

In essence, the key learning is that the projection-based approach was effective enough to simulate the experience of having a tattoo. Participants wanted an even wider variety of tattoo styles, the context of cultural depth and a more detailed understanding of specific motifs shown. Moving forward, I will explore ways to address the challenges related to participant positioning and shadows so that the user experience remains unchanged.

### 5.1.7 PROJECTED TATTOOS PART TWO

The next step in my prototype involves a static station where individuals can explore tattoos on their skin using a projection-based concept to simulate the tattoo experience. The participants were five fellow students and Martin Fröhlich, an employee from the immersive art space. The circumstances were set in the project room of the atelier to ensure a dark environment, allowing the projected tattoos to appear clearly. By including a tattoo armrest, similar to those in tattoo studios, at hip height, users can comfortably rest their arm for the tattoo projection while standing, avoiding shadows that could disrupt the projected image.

I aimed to observe user reactions to animated tattoo designs, believing that animations combined with audio information about tattoo cultures would enhance engagement and excitement. I animated a Maori design, incorporating simple animations like moving the mouth and eyes as if the figure were speaking. I also added and removed elements in the background of the arm sleeve to create dynamic visuals.

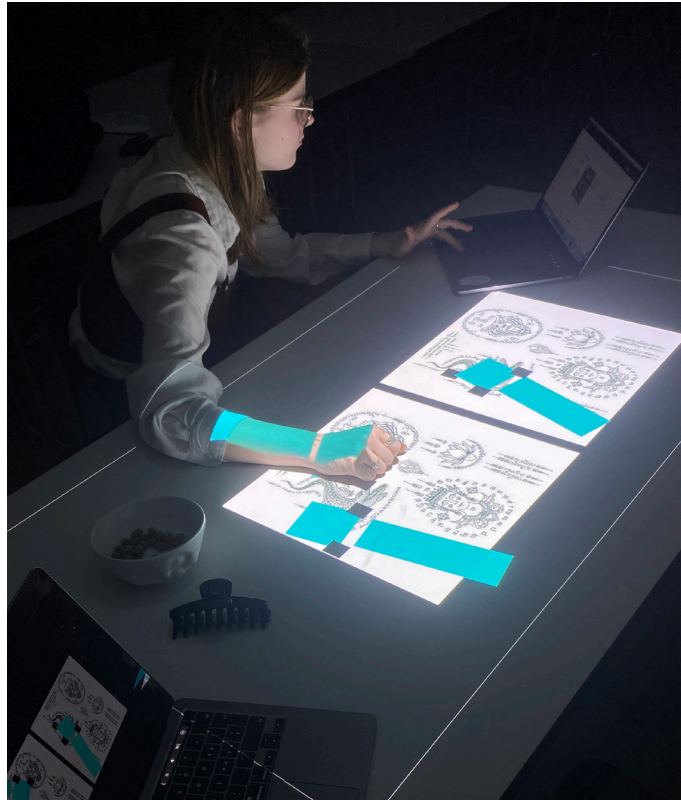
The prototype feedback was overwhelmingly positive. Participants showed high levels of engagement, spending more time than expected analyzing the moving tattoo simulation on their arms. The animated elements, particularly the “talking” aspect, captivated them.

Participants were particularly interested in the animated elements and requested more animations that made the tattoo feel wrapped around their arms. They were enthusiastic about learning the cultural meanings and backgrounds of the tattoo designs.

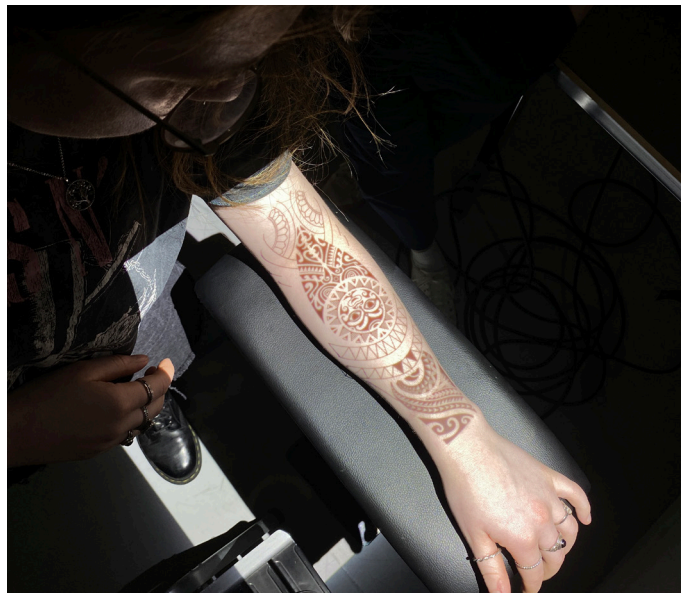
Most participants placed their upper arms in the intended position, allowing the projection to hit the outer side of their forearm. However, one participant placed their inner forearm in the projection area, revealing an insight: projecting onto the inner forearm provided a flat surface, eliminating design distortion and avoiding hair interference.

Participants expressed willingness to spend time at the stations but preferred short, engaging information over lengthy historical narratives. They suggested incorporating timelines to provide a broader context for the evolution of tattoo cultures, focusing on a more comprehensive range of tattoo cultures with engaging facts rather than in-depth histories.

These findings prompted me to revise my initial concept of three separate stations, which felt lacking in embodiment, excitement and cohesive narrative. In the next steps of the exhibition process and concept development, I will focus on creating a complete and immersive experience that incorporates these key elements while building on the positive feedback from prototype testing.



18, Setting up the placement of the projected area



19, User Testing the Projected Tattoo Part Two

# CONTENT

### **5.2.1 PHASE ONE: HISTORICAL RESEARCH**

“Circle of Ink” is an immersive, interactive installation that explores the rich history, cultural significance, and personal narratives of tattoo art. The project aims to bridge the gap between those with and without tattoos by combining projection mapping technology, audio storytelling, and hands-on interaction, fostering a deeper understanding and appreciation of this ancient and enduring art form.

My goal is to inform others about various tattoo eras, cultures, and art forms, so I decided to base my content on historical information gathered from books, papers, and articles. To ensure that the information presented was manageable in scope and personally engaging, I focused on selecting the most exciting and relevant details about each tattoo style or tradition I wanted to showcase.

### **EVALUATION**

However, to confirm that the information I chose would be valuable and captivating to others, I sought out the expertise of individuals working in the tattoo industry. After conducting my first interview with Jordan, a Traditional Western tattoo artist, I realized that these recordings could serve as the highlights of my exhibition. Listening to the speaker’s words directly creates a more personal and intimate experience for the audience, allowing them to connect with the information more deeply.

By incorporating these personal interviews, I hope to spark curiosity and encourage visitors to delve further into the topics that pique their interest. The audios serve as a starting point, providing a glimpse into the rich history and cultural significance of tattooing. If visitors want to learn more about a particular aspect of tattoo art or culture, they will be motivated to continue their research independently.

This blend of carefully curated historical information with the unique insights and perspectives offered by tattoo artists and enthusiasts will create an engaging, informative exhibition that will celebrate the art form’s past while inspiring a whole new generation of appreciation and understanding.

### **5.2.2 PHASE TWO: INTERVIEWS**

The best way to understand and appreciate the art of tattooing is through direct involvement with the people who live and breathe the art form daily. Communicating with tattoo artists and individuals with tattoos is important to understand this art form better. Tattoos are personal; each design has a different story and meaning to the wearer. Reaching out to the tattoo community, I was trying to get to those stories and enlighten the deeper values that tattoos hold for people.



## **SELECTION PROCESS FOR INTERVIEWEES**

In selecting the tattoo artists and individuals to interview, I sought diverse perspectives and experiences. I wanted to focus on artists who specialize in Western Traditional and Japanese tattooing styles since these are the subcultures I wish to display in the exhibition. Additionally, I looked for individuals covered with tattoos by assuming that distinctive choices were made through personal stories or experiences related to their body art.

## **INTERVIEW METHODOLOGY**

I chose this for the interview to be semi-structured since I needed both breadth and depth. This format meant I could prepare guiding questions for the interview but simultaneously allowed the conversation to flow freely and novel insights to pop up. My questions ranged from the importance of tattoos in the interviewees' lives to their reflections on changing tattoo culture and society's perception of tattoos. By leaving space in the interviews, I created an avenue for the interviewees to share their stories and reflections authentically and meaningfully.

## **INTERVIEW METHODOLOGY**

I chose this for the interview to be semi-structured since I needed both breadth and depth. This format meant I could prepare guiding questions for the interview but simultaneously allowed the conversation to flow freely and novel insights to pop up. My questions ranged from the importance of tattoos in the interviewees' lives to their reflections on changing tattoo culture and society's perception of tattoos. By leaving space in the interviews, I created an avenue for the interviewees to share their stories and reflections authentically and meaningfully.

## **INTERVIEWEE PROFILES AND CONDUCTED INTERVIEWS**

I conducted interviews with two tattoo artists: Jordan Angius, who practices Western traditional tattooing, and Raphael Bühlmann, who specializes in Japanese Irezumi. I chose them because I have been personally interested in their work for some time. Jordan Angius works at the studio (Love Street Tattoo in Zurich) where I got one of my tattoos. Traditional tattoo designers, especially Traditional Japanese tattoo artists, are often rare due to the intricate learning process they must undergo. Raphael Bühlman, therefore was an artist I had in mind right away. He was also featured in an article by SRF in 2020 which shows his recognition in addition. I follow both artists on Instagram and have been fascinated by their work. I emailed them and was thrilled to be invited to their studios (Love Street Tattoo in Zürich where Jordan works and Kazoku Sanzan in Zürich where Raphael is the Owner) .

I selected three individual tattoo wearers based on their number of tattoos. All of them are fairly covered in tattoos. Olivia Sindico, a friend of mine and her boyfriend Dennis Züllig were among them. Levin Settler Brogli, who also attended ZHdK, shares my interest in tattooing. We connected through this shared interest, and I have tattooed him multiple times, which strengthened our connection.

The interviews lasted about 45 minutes on average.

The key message of Jordans' interview was the importance of understanding traditional tattooing techniques and the importance of references from the past in developing a unique style. The artist highlighted that tattoos should have personal meaning and aesthetic value, comparing them to clothing that makes one feel comfortable and better about themselves. The overall goal is to create tattoos that look good, feel meaningful and bring joy to the wearer.

"You need to wear something you're comfortable in and that makes you feel better than you were before. You need to be happy about it. Whatever makes you feel better."

The key message of the conversation with Raphael is that tattooing in the Japanese style involves more than just the physical act; it requires a deep understanding of Japanese culture and adherence to specific traditional rules and patterns. The artist emphasizes the significance of the background elements in Japanese tattoos, such as flowers, water and clouds, which often hold more importance than the main subject. He highlights that those Traditional Japanese tattoos should be personalized, reflecting the individual's birth month or balancing their personality traits, for example. The bond between the tattoo artist and the client through the process is profound, built on trust and the shared experience of creating the tattoo. This ongoing connection and the unique, personalized approach to each tattoo keep the artist passionate about their work.

"If you're tattooing Japanese, it's more than tattooing. You need to know about Japanese culture in general to do good Japanese tattoos. And you need to follow certain rules and certain patterns."

Olivia is a passionate collector of tattoos. She is particularly interested in how body art can serve as a tool for self-expression and empowerment. Her tattoos tell a deeply personal story of resilience and transformation.

"The real push to get me started with actually covering my body, not only having a few, was that I wanted to create my own body, (...) my safe body, because I used to have a lot of bad events in the past, also (...) with sexual harassment, (...), just getting touched by people who I did not want to be touched by and getting tattoos somehow gave me the opportunity to create that body, that (...) never touched by this person. It's like a huge psychological thing for me. Not anymore, like, now I'm getting tattoos because I just love it and I see myself being covered but it used to be a big reason why I got them done."

Levin is an individual whose tattoos are integral to their identity as an artist. With an oh-so-recognizable aesthetic, they draw something positive from it: being memorable.

Dennis is a collector of a unique tattoo style known as blackout tattoos. He initially chose this style to cover another tattoo, but he was so pleased with the result and the process that he decided to continue with this style. His tattoos act as a diary, allowing him to look back and remember his state of mind at the time he got each one.

Quotes in Swiss German:

“(...) De (Tättoowierer) hett sehr vell bunti Farbe brucht und ich ha sehr schnell gmerkt dass mir das nümme gfallt und (...) vorallem eso dass me’s ned anders hetti chönne covere. Blackout ish würklich die einzig Lösig gsi. Das hani gmacht und de ganz Prozess und das Tattoo a sich hett mir so gfalle, dass ich’s au witter gführt ha (...). (...) Jedes Tattoo dass ich ahluege (...) setz ich i Verbindig zu einzelne Phase vo mim Lebe und das ish das was mir a minere Tattoos am meiste Spass macht.”

Translated to English:

“(...)The tattoo artist used a lot of bright colors and I quickly realized that I didn’t like it anymore (...) especially in the way that it couldn’t have been covered up any other way. Blackout was really the only solution. I did that and I liked the whole process and the tattoo itself so much that I continued with it (...). (...) I connect every tattoo that I look at (...) to individual phases in my life and that is what I enjoy so much about my tattoos.”

### **5.3 INTERACTION: ILLUMINATION OF PROJECTED TAT- TOOS**

#### **3.5.1 PHASE ONE (INFRARED SEN- SOR)**

To trigger the projection and the accompanying sound (narratives), I wanted to track the user’s arm as an indicator for the projection. One potential option was to utilize infrared cameras that can recognize the user, specifically their arm, to initiate the projection. Infrared cameras were considered due to their ability to detect the users’ body temperature, making the environment and lighting conditions less of an obstacle. This is particularly relevant because I work with projections, which require a dark environment, and using regular cameras could lead to unreliable results due to the reflection of light.

However, further investigation revealed better options than the infrared camera for my specific setup. Despite its quick response time, the infrared camera was incompatible with my laptop, which posed a significant challenge. As a result, I had to explore alternative methods to achieve the desired arm-tracking functionality while ensuring seamless integration with my existing hardware and software setup.

I then contacted Martin Fröhlich, a research assistant in the field of the immersive art space who is an expert in projection mapping and tracking, to assist me in this field. I did ask him about the infrared camera issue for projection mapping tracking, but he steered me in a different direction and strongly advised against it. He said he would have difficulty completing such a project in this timeframe, even as an expert. The idea has been abandoned since I do not have nearly as much experience in this area as he does. However, he did make an alternative suggestion: light sensors.

### 5.3.2 PHASE TWO (LIGHT SENSOR, TOUCH DESIGNER)

After realizing that the infrared camera was not a viable option for my setup, I needed to find another way to trigger the projection that would work well with my environment, which plays a crucial role due to the contrast between light and dark. Martin Fröhlich kindly suggested exploring light sensors, which initially seemed impractical due to the potential inconsistency of light and darkness in my environment. However, upon further consideration, I realized this approach could be feasible.

The proposed solution involves placing light sensors on the surface where the user's arm is intended to be placed. The system would be in standby mode when no arm is detected, displaying a bright projection. However, when the user places their arm on the designated surface, the light sensors detect the darkness created by the arm's shadow. This light level change would trigger the desired projection and accompanying sound.

Although the inconsistency of light and darkness in the environment was a concern, placing the sensors on the surface where the arm is expected to be positioned helps mitigate this issue. The localized shadow created by the arm would be sufficient to activate the sensors, regardless of the overall lighting conditions in the room. Grateful for Martin Fröhlich's suggestion and excited by this approach's potential, I decided to implement it.

Having decided to pursue the light sensor-based approach suggested by Martin Fröhlich, I began my implementation by using four light sensors connected to an Arduino board. This initial setup allowed me to test the feasibility of triggering specific actions, such as playing videos, when each light sensor detected darkness.

To bring this idea to life, I sought the assistance of Paulina Zybinska, who provided valuable support and expertise in integrating the light sensors with the Arduino boards and programming the desired functionality in the program TouchDesigner. With Paulina's help, I could configure the system so that when an individual light sensor detected darkness, it would trigger the playback of a corresponding video.

This preliminary test was crucial in validating the concept and demonstrating that the light sensor-based triggering mechanism could be realized. By successfully linking the detection of darkness on each sensor to the playback of specific videos, I confirmed that the system could respond to the user's arm in the designated area.

### 5.3.3 ADDITION TO HAPTICS

On further reflection, I realized that resting my arm on a flat surface felt unnatural; it lacked the same tactile as a regular armrest would. Armrests are common in tattoo studios to support a client's arm while getting a tattoo. They help provide both comfort and stability. I wanted to add this same normality to my installation experience, as I did in one of the tests, to give users more of an immersive and real-life experience.

For this, I considered integration with the circular table concept and the haptic quality of an armrest. However, instead of having a conventional armrest with an attached pole to a rounded table, I decided to make individual armrest cushions that would be freely placed on top of the round table. This would allow for a more harmonious integration of the armrests with the design of the round table while still having the same tactile feel.

The first thing I did was to find the materials necessary for this concept. I used MDF (Medium Density Fiberboard) plates that I cut in size and shape to form the base of the armrests. Since these had to be comfortable and supportive, I purchased some seat cushions that would be attached to the MDF. Lastly, I chose a leather fabric to cover the cushions for a professional and pleasing appearance.

While creating these custom armrests, I frequently compared my work to an actual tattoo armrest I could access. This allowed me to ensure that my armrests' dimensions, proportions, and overall feel closely mimicked those used in professional tattoo studios. By referencing the authentic armrest, I was able to make necessary adjustments and refinements to my design until I achieved a result that I was satisfied with.

Moreover, the tactile feedback the armrest provided helped create a more engaging and interactive experience. As users placed their arm on the cushioned surface, they could feel the leather fabric's texture and the cushion's softness, adding a sensory element to the installation that complemented the visual and auditory components.

The combination of the familiar armrest shape and the haptic feedback it provided contributed to the overall goal of transporting users into the world of tattooing and fostering a deeper connection with the art form.

#### **5.3.4 PHASE THREE: IMPLEMENTING BUTTON TRIGGERS WITH MADMAPPER**

After the progress session and discussions about the trigger content, Johannes Reck, the teaching assistant in my department, suggested a more straightforward and reliable approach to the trigger mechanism. He recommended using buttons in combination with MadMapper. This method eliminates the dependency on environmental indicators and allows me to work with hardware, specifically Arduinos, which I am familiar with.

Using buttons offers several advantages. It simplifies the system by avoiding the complexities of infrared and light sensors. Since I have experience working with Arduinos, this approach is more manageable, ensuring a smoother implementation process and easier troubleshooting. Moreover, ambient light or other environmental conditions do not affect buttons, making the system more robust and dependable.

The Arduino will read button presses and transmit the respective keyboard signal. Each button will have an assigned letter; for example, button one will be 'a', button two 'b', and so on. When a button is pressed, the Arduino will send a specific keyboard letter signal to the computer. This signal will then be recognized by MadMapper, which will trigger the corresponding projection. For example, pressing the button connected to the Arduino that sends the 'a' key will start the associated projection.

To implement this system, I will use five buttons, each corresponding to a different station in the exhibition. The buttons will be soldered to long cables, allowing flexible placement on the table surface. The other end of the cable will be connected to the Arduino board, ensuring a secure and reliable connection. The wires and Arduino board will be routed under the table and inside the pedestal to keep the setup clean and unobtrusive.

Adopting this button-trigger system makes the setup more user-friendly and reliable. The user simply needs to place their arm on the modified armrests to trigger the button placed under the armrest, which finally triggers the projection along with the implemented sound.

# Exhibition Concept

## **6.1 THE FIVE STATIONS**

The five stations delve into a particular aspect of tattoo culture and history. All these stations are intended to help a user comprehensively study the art form, from its ancient origins to its modern expressions and future possibilities. This makes for an extensive and multi-dimensional understanding of tattoo art and culture. Each station adds to a broader knowledge of the historical, personal, and cultural dimensions of tattooing to allow the users to develop a rich and nuanced appreciation for this art form.

### **6.1.1 BEGINNING OF TATTOOING**

This station will highlight the oldest evidence of tattooing: the tattoos of Ötzi, the 5'300-year-old mummy found in the Alps (CNN, 2024). It speaks about the theory that Ötzi's tattoos were some forms of acupuncture from ancient times and, in such a way, gives insight into the probable medicinal and spiritual purposes of tattooing in prehistoric times.

### **6.1.2 PERSONAL PERSPECTIVES**

Here, visitors can hear personal stories from three people—Olivia, Levin, and Dennis—who share their stories and the meaning of their tattoos. These stories look into the varied reasons and meanings behind modern tattoos, creating empathy and understanding among users.

### **6.1.3 FUTURE OF TATTOOING**

This station delves into the research surrounding the future of tattooing. It presents various possibilities, such as using bio-inks, tattoos as medical tools, semi-permanent tattoos, and integrating tattoos into digital realms. Users can explore these potential advancements and imagine how the art form might evolve in the coming years.

### **6.1.4 WESTERN TATTOOING**

Here, users can engage with the interview of tattoo artist Jordan, who shares key insights into the Western Traditional tattooing style. The station highlights the significance of understanding traditional techniques, the importance of references from the past, and the role of personal meaning and aesthetics in creating meaningful tattoos.

### **6.1.5 JAPANESE TATTOOING**

This station features an interview with Raphael, a tattoo artist specializing in Japanese tattooing. It emphasizes the deep cultural roots and symbolism embedded in Japanese tattoo art and the importance of adhering to traditional rules and patterns. Users can learn about the unique aspects of Japanese tattooing and the profound connection between the artist and the client.



## **6.2 NAVIGATION**

To enhance the installation's intuitiveness, a projected visualization of an arm will be displayed on each armrest, guiding users to place their arms in the designated areas without the need for extensive written instructions. The five stations allow multiple users to explore the installation simultaneously while enabling observers to engage from a distance.

## **6.3 PERSONAL NARRATIVES**

Incorporating personal narratives aims to create a sense of intimacy and generate empathy among users. By listening to the emotional stories shared at the station involving the presence of tattooing, visitors can gain a deeper understanding of the personal significance of tattoos and hopefully spark curiosity within the art form.

## **6.4 CIRCLE AS A METAPHOR**

The circular table stands in the middle of the installation, symbolizing the cycles, interconnections, and continuous change of tattoo culture. This will come to represent the journey of the art form from its most ancient origins to its contemporary expressions and future possibilities. The circular layout also encourages users to explore the stations non-linearly, emphasizing the interconnectedness of tattoo culture across time and space.

## **6.5 TACTILE APPROACH WITH MODIFIED ARMREST**

Including modified armrests, designed to mimic those found in tattoo studios, adds a tactile dimension to the installation. By providing a familiar and comfortable surface for users to rest their arms, the armrests enhance the immersive experience and create a stronger connection to the world of tattooing. The presence of these custom-designed armrests indicates the five stations.

## **6.6 TECHNICAL IMPLEMENTATION**

Each modified armrest has buttons triggered when users place their arms on the designated surface. These buttons activate the projection of tattoo designs onto the user's skin, accompanied by audio narratives and information delivered through headphones. This technical setup allows for a seamless and interactive experience, enabling users to engage with the content hands-free.

## **6.7 PROJECTED TATTOOS**

One of the key features of the installation is the ability for users to see projected tattoos on their arms without the commitment of getting a permanent one. This allows visitors to experience the visual and emotional impact of tattoos and explore different designs risk-free, fostering a deeper appreciation for the art form when seeing them on their skin.

## 6.8 THE VISUALS

In traditional tattooing, copying and reinterpreting designs is accepted and embraced as part of the process of creating. For hundreds of years, tattooists have honed their trade by following others' example, reproducing the works of their mentors, and gradually finding their own style and voice through subtle variations and innovations on classic motifs. I carefully chose designs for both Western and Japanese sections that best represent each style with respect to major characteristics and aesthetics to adapt myself to design the visuals for the sections on the cultural and historical background of tattooing.

I was keen on respecting intellectual property and the creative contributions of the artists whose work I drew inspiration from. Instead of simply appropriating the designs without permission, I reached out to the artists directly, explained the nature of my project and sought their consent to use their work as a guide in making my creative explorations. The artists I got through to were enthusiastic about the project and gave me free will to base my work on their designs. They even recommended I copy from existing platforms, which I adapted.

I made a conscious decision to maintain a cohesive and minimalistic aesthetic throughout the installation. By opting for a monochromatic color scheme, utilizing only black and white, I aimed to create a sense of unity and simplicity. This minimalist approach unifies the installation's various elements but also reflects my personal graphic design preferences. I believe that by stripping away unnecessary visual complexity, the core messages and emotions conveyed through the tattoo designs and personal stories can resonate more powerfully with the audience. To achieve this clean and streamlined look, I often traced existing images and refined them to their essential elements. This process involved carefully selecting tattoo designs representative of the various styles and cultures showcased in the installation, such as American Traditional and Japanese Irezumi.

American Traditional tattoos, executed in bold lines, held iconic imagery like roses, eagles and anchors. These designs, inspired by the work of legendary artists like Sailor Jerry and Don Ed Hardy, sum up the essence of the style's roots in sailor culture and its association with concepts like courage, patriotism and adventure.

For the Japanese Irezumi section, I have taken inspiration from the rich iconography and symbolism of this art form. Designs with koi fish, dragons, cherry blossoms and samurai were recomposed meticulously to represent the fine linework and composition of this style. By adhering closely to the original motifs and techniques, these visuals pay respect to the deep cultural significance and artistic legacy of Japanese tattooing.

It is, therefore, important to note that in coming up with these adapted designs, I took a different approach to creating the visuals in the section focusing on contemporary tattoo culture and personal narratives. I showed a version of the real tattoos of the people from the interviews: Olivia with her fine-line flower design, Levin with their motives and Dennis with his blackout tattoo. By digitally recreating their tattoos and projecting them onto the users' skin, I wanted to connect the viewer to the stories of the origin of these personal works of art. This way, one can see the diversity and creativity of modern tattooing on their own body while putting an emphasis on just how personal and meaningful these tattoos are to those who wear them.

For the more informative and speculative sections, such as the sections on the beginning and future of tattooing, I opted for visuals that closely aligned with the presented educational content. In the section on the beginning of tattooing, for example, I created designs based on the tattoos found on the Ötzi mummy, using simple geometric patterns and lines to reflect the rudimentary tools and techniques of ancient tattooing. Similarly, for the section on the future of tattooing, I incorporated visuals that suggested the potential applications of emerging technologies, such as changing tattoos.

## **6.9 HEADPHONES**

Each station is equipped with headphones, which serve multiple purposes. First, they allow users to immerse themselves in the audio content without disturbing others, enabling an experience without invading the public exhibition with other projects in general. Second, the headphones provide a sense of privacy, acknowledging the intimate nature of tattoos and the personal stories shared throughout the installation. By creating an individual audio space, users can engage with the content at their own pace and level of comfort.

## **6.10 ENHANCING FOCUS**

The installation isolates users from external distractions by shielding noises around the exhibition through headphones. Additionally, by providing a moving projection on the user's arm, the installation enables a deeper level of engagement and retention of information in front of them, giving the users an increased sense of immersion and connection to the installation's subjects.







# **REFLECTION AND EVALUATION**

## 7.1 ANSWERING MY RESEARCH QUESTIONS

As I developed this installation, there were several key research questions that I have worked with, guiding my process to shape the outcome.

“Why do people get tattoos, and what are the rich cultural and historical backgrounds behind this ancient practice?”

People get tattoos for very deep reasons, from the expression of self to identity and spiritual and social reasons. For this reason, the tattoo is a powerful way to express oneself, to make a statement about one’s beliefs, experiences, and self-concept. They may also carry great cultural and historical depth because different styles and motifs of tattooing represent singular traditions, symbols, and cultural contexts.

Tattoos have been an integral part of many ancient civilizations in history. Such practices can be traced back to tattoos’ medicinal and spiritual roles, as seen in the 5,300-year-old Ötzi mummy. In Polynesian cultures, tattooing was not a ritual; it was sacred, with the designs symbolizing social status, cultural identity, and spiritual protection. Japanese Irezumi, which began in the Edo period, evolved from a kind of punishment to an artistic expression of rebellion and individuality. Born from sailor culture, American Traditional tattoos represented courage, patriotism, and a life of adventure.

By examining the different motivations and rich cultural backgrounds of tattooing, we can understand the reasons behind the enduring appeal of this ancient art that continuously captures and inspires the world.

From what Olivia Sindico, Levin Settler Brogli and Dennis Züllig shared in their stories, it was evident that this aspect of tattoos has made them memorable. The permanency of marking one’s skin makes the bond with what is worn more intense, giving the wearer the tattoo identity and personal history. The bond formed by having to wear the same design permanently makes it a constant reminder of experiences, emotions and beliefs behind the desire to get the tattoo.

“How do personal narratives from tattoo artists and wearers contribute to a more comprehensive understanding of the significance and meaning behind tattoos?”

On the other hand, the life stories of tattoo artists and wearers are invaluable in exploring the emotional, cultural, and personal meaning of the tattoos received or done by them. Such firsthand accounts unfold very intimate stories, experiences, and motives that shape a decision to get tattooed and, hence, offer a much better and deeper insight into the whole art form. Interviews with artists like Jordan and Raphael revealed insight into the creative process, the importance of cultural traditions, and deeply formed relationships between artists and clients. Their personal stories illustrate technical skills, artistic vision, and cultural knowledge, all of which are molded into a meaningful tattoo.



People with tattoos, like Olivia, Levin, and Dennis, bring their observers into the personal, transformative experiences that drive them to mark their bodies with ink. Their stories reveal ways tattoos can be tools for self-expression, empowerment, and healing, including how they negotiate social perceptions and stigmas about tattoos (Kosut, 2000). Engaging in these personal narratives could lead to a richer, more empathetic understanding of the meanings behind tattoos and the powerful impact they have on the lives of those who wear them.

“How can the entire experience of having tattoos, with all its profound personal, cultural, and historical dimensions, be effectively conveyed to non-tattooed individuals through an immersive, interactive installation?”

For those who do not have tattoos (yet), “Circle of Ink” is an immersive experience that allows users to visualize tattoos on their skin temporarily. Engaging with the projected designs and listening to personal stories from tattoo wearers allows the visitor to understand the significance and meaning tattoos hold for the wearers.

The use of projection mapping technology brings design to life, allowing visitors to view tattoo designs on their skin temporarily, thus creating a strong visual and emotional link to the art form. This experience serves to demystify the tattooing process and garner sympathy for those who have chosen to mark their bodies permanently.

In addition, personal narratives of tattoo artists and wearers, shared through audio recordings, make the experience authentic and add an intimate dimension to the installation. These stories contain context, meaning, and emotional resonance, enabling visitors to understand fully the significance that a tattoo could hold in a person’s life.

The interactive nature of the installation draws visitors in to explore the variety in tattoo styles, cultures, and stories at their own pace. It creates a sense of curiosity, discovery, and self-reflection appropriate to anyone looking through the content in a non-linear, highly personalized manner, thus creating their own connections to the art form and its rich history.

Ultimately, “Circle of Ink” offers an immersive, multisensory experience and becomes a powerful vehicle for understanding, empathy, and appreciation of deeply personal, cultural, and historical dimensions associated with tattoos among non-tattooed individuals.

## 7.2 CONTRIBUTION TO INTERACTION DESIGN

Tattoo culture is not a common topic within the field of interaction design. It represents a niche interest, largely driven by personal passion and cultural significance rather than mainstream academic discourse. However, the intersection of tattoo art and interaction design offers unique opportunities to explore how deeply personal forms of expression can be integrated into interactive experiences. With its rich traditions and profound personal narratives, I think tattoo culture can bring a unique dimension to interaction design.

Tattoos are inherently filled with personal stories and motivations that form a rich narrative layer. Integrating these narratives into interactive installations could evoke deeper emotional connections and even empathy with users. The meanings of tattoos vary across cultures and symbolize everything from rites of passage to symbols of social status. Inclusive interaction design projects are fostered by this kind of cultural diversity.

Getting a tattoo involves several senses: sight, touch, and, at times, even sound. These can be emulated within interaction design for a more engaging, immersive user experience. Tattoos have been a powerful symbol of personal identity and self-expression. Drawing on this aspect, interaction designers can develop projects that resonate on a personal level and enable users to see themselves reflected in the work.

This project is a contribution to interactive design that educates about the richness of the history of tattoo art and provides a new way for people to relate to this form of art on a personal level, hence extending the horizons of what is possible in interaction design.

This project's focus on immersion, multi-sensory involvement, and an absence of expectations about users' behaviors separates it from most conventional museum exhibits and information displays. By inviting its users to explore tattoo art, "Circle of Ink actively" promotes deeper comprehension and appreciation than the simple amassing of facts and figures would be achieved.

In addition, the installation brings up the issue of closing the divide between tattoo wearers and non-tattoo holders by educating about the rich cultural and historical background of the art of tattooing. It is, therefore, crucial in advancing the establishment of empathy, dialogue and cultural understanding. Offering a platform for shared experiences and personal narratives, "Circle of Ink" contributes to the ongoing dialogue about tattoos in modern society and their role in preserving and celebrating this ageless art form.

### 7.3 NEXT STEPS

There are several future directions in which I plan to develop and extend my project. A possible future development would involve covering more tattoo styles and cultural traditions. There are a dozen more tattoo eras and cultures to feature. By including these, I could enable even deeper insight into the world history and diversity of tattooing.

Another option is the possibility of new emerging technologies—for example, augmented reality or haptic feedback—pushing boundaries in the senses' domains and changing the installation's experience.

The future of "Circle of Ink" lies in its ability to continue sparking curiosity and understanding of history and its long-lasting effect on tattoo art. This project could change how we understand, appreciate and celebrate this most powerful form of human expression through its constant innovation, collaboration and interaction with the tattoo community and the general public.

## BIBLIOGRAPHY

This bibliography is organized into chapters (Books, Academic Papers and Articles and Websites) and is alphabetically ordered.

### BOOKS

Ashcraft, B., & Benny, H. (2016). *Japanese Tattoos: History \* Culture \* Design*. (p. 4)

Gilbert, S. (2000). *Tattoo History: A Source Book*. New York: Juno Books; Berkeley, CA: US bookstore distribution, Publishers Group West.

Green, T. (2003). *The Tattoo Encyclopedia: A Guide to Choosing Your Tattoo*. New York: Simon & Schuster.

Hardy, D. E., & Selvin, J. (2013). *Wear your dreams: My life in tattoos*. Thomas Dunne Books. (p. 23)

Shilling, C. (2012). *The body and social theory* (3rd ed.). London: SAGE Publications.(p. 6) <https://www.gacbe.ac.in/images/E%20books/Body%20and%20Social%20Theory%20Theory,%20Culture%20&%20Society.pdf>

### ACADEMIC PAPERS AND ARTICLES

Baranska, A., Shawket, A., & Jouve, M. (2018). Unveiling skin macrophage dynamics explains both tattoo persistence and strenuous removal. *Journal of Experimental Medicine* [https://www.researchgate.net/publication/323589459\\_Unveiling\\_skin\\_macrophage\\_dynamics\\_explains\\_both\\_tattoo\\_persistence\\_and\\_strenuous\\_removal](https://www.researchgate.net/publication/323589459_Unveiling_skin_macrophage_dynamics_explains_both_tattoo_persistence_and_strenuous_removal)

Chu, J. (2017, December 5). Engineers 3-D print a "living tattoo." MIT News. <https://news.mit.edu/2017/engineers-3-d-print-living-tattoo-1205>

Javornik, A., Kostopoulou, E., Rogers, Y., Fatah gen. Schieck, A., Koutsolampros, P., Moutinho, A. M., & Julier, S. (2018). An experimental study on the role of augmented reality content type in an outdoor site exploration. *Behaviour and Information Technology* [https://www.researchgate.net/publication/327042858\\_An\\_experimental\\_study\\_on\\_the\\_role\\_of\\_augmented\\_reality\\_content\\_type\\_in\\_an\\_outdoor\\_site\\_exploration](https://www.researchgate.net/publication/327042858_An_experimental_study_on_the_role_of_augmented_reality_content_type_in_an_outdoor_site_exploration)

Kao, C., Holz, C., Roseway, A., Calvo, A., & Schmandt, C. (2016). DuoSkin: Rapidly Prototyping On-Skin User Interfaces Using Skin-Friendly Materials. *Proceedings of the 2016 ACM International Symposium on Wearable Computers (ISWC 2016)*, ACM, New York, NY, USA, 16-23. [https://www.christianholz.net/2016-iswc16-kao\\_holz\\_calvo\\_schmandt-DuoSkin-Rapidly\\_Prototyping\\_On-Skin\\_User\\_Interfaces\\_Using\\_Skin-Friendly-Materials.pdf](https://www.christianholz.net/2016-iswc16-kao_holz_calvo_schmandt-DuoSkin-Rapidly_Prototyping_On-Skin_User_Interfaces_Using_Skin-Friendly-Materials.pdf)

Kim, J., Campbell, A. S., Esteban-Fernández de Ávila, B., & Wang, J. (2019). *Wearable biosensors for healthcare monitoring*. Epub, February 25, 2019. <https://pubmed.ncbi.nlm.nih.gov/30804534/>

- Kosut, M. (2000). Tattoo narratives: The intersection of the body, self-identity and society. *Visual Sociology*, 15(1), (pp 79-100) <https://www.tandfonline.com/doi/abs/10.1080/14725860008583817>
- Lim et al. (2013). A study of the philosophy and ideology of tattoos in contemporary China. *Asian Social Science*, 9(17). <https://www.ccsenet.org/journal/index.php/ass/article/view/29399>
- Liu, X., Yuk, H., Lin, S., Parada, G. A., Tang, T. C., Tham, E., de la Fuente-Nunez, C., Lu, T. K., & Zhao, X. (2018). Responsive Materials: 3D Printing of Living Responsive Materials and Devices. *Advanced Materials*, 4, 2018. [https://www.researchgate.net/publication/322646073\\_Responsive\\_Materials\\_3D\\_Printing\\_of\\_Living\\_Responsive\\_Materials\\_and\\_Devices\\_Adv\\_Mater\\_42018](https://www.researchgate.net/publication/322646073_Responsive_Materials_3D_Printing_of_Living_Responsive_Materials_and_Devices_Adv_Mater_42018)
- Lodder, M. (2010). Body Art: Body Modification as Artistic Practice. [https://www.researchgate.net/publication/282667817\\_Body\\_Art\\_Body\\_Modification\\_as\\_Artistic\\_Practice](https://www.researchgate.net/publication/282667817_Body_Art_Body_Modification_as_Artistic_Practice)
- Macedo, S. (2021). Reclaiming the body through tattoos. *European Scientific Journal, ESJ*, 17(22), 37-46. <https://doi.org/10.19044/esj.2021.v17n22p37>
- Zhang, B., Gao, L., Ma, L., Luo, Y., Yang, H., & Cui, Z. (2019). 3D bio-printing: A novel avenue for manufacturing tissues and organs. *Engineering*, 5(4), 777-794. <https://www.sciencedirect.com/science/article/pii/S2095809918311470>
- Ojeda, V. D., Magana, C., Hiller-Venegas, S., Romero, L. S., & Ortiz, A. (2022). Motivations for seeking laser tattoo removal and perceived outcomes as reported by justice involved adults. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9669733/>
- Pew Research Center. (2023). 32% of Americans have a tattoo, including 22% who have more than one. <https://www.pewresearch.org/short-reads/2023/08/15/32-of-americans-have-a-tattoo-including-22-who-have-more-than-one/>
- Pimentel, D., Kalyanaraman, S., Fillingim, R., & Halan, S. (2019). VR and Volitional Pain: Testing Immersive Interventions During a Tattoo. <https://ieeexplore.ieee.org/document/8797681/authors#authors>
- Skutlin, J. M. (2018). Fashioning tattooed bodies: An exploration of Japan's tattoo stigma. *Asia Pacific Perspectives*, 16(1). <https://jayna.usfca.edu/asia-pacific-perspectives/center-asia-pacific/perspectives/v16n1/skutlin.html>
- Zhang, B., Gao, L., Ma, L., Luo, Y., Yang, H., & Cui, Z. (2019). 3D bio-printing: A novel avenue for manufacturing tissues and organs. *Engineering*, 5(4), 777-794. <https://www.sciencedirect.com/science/article/pii/S2095809918311470>

## WEBSITES

Black Widow Tattoo. (2021). Tattoo Pioneers: Charlie Wagner. <https://www.widowtattoo.com/blog/tattoo-pioneers-charlie-wagner>

CNN. (2024). Ötzi the Iceman: New study on ancient tattoos. <https://edition.cnn.com/2024/04/09/style/otzi-iceman-tattoos-study-scn/index.html>

Deter-Wolf, A. (2021). Tattoo Archaeology. <https://vessel-magazine.no/issues/7/transforming-bodies/tattoo-archaeology>

Encyclopaedia Britannica. (n.d.). Yakuza. <https://www.britannica.com/topic/yakuza>

Naval History and Heritage Command. (n.d.). Sailor's tattoos. <https://www.history.navy.mil/browse-by-topic/heritage/customs-and-traditions0/sailor-s-tattoos.html>

Park, P. (2023, July 12). The Influence of Japanese Woodblock Prints in Tattoo Design: Traditional Ukiyo-e Art in Tattoos. <https://xtremeinks.com/de/blogs/artists-corner/the-influence-of-japanese-woodblock-prints-in-tattoo-design-traditional-ukiyo-e-art-in-tattoos>

Roe, P. (2019). Medical Mechanics of Tattooing. <https://www.jamesstreetparlour.com/medical-mechanics-of-tattooing>

The Art Story. (n.d.). Ukiyo-e Japanese Prints Movement Overview. <https://www.theartstory.org/movement/ukiyo-e-japanese-wood-block-prints/#:~:text=Ukiyo%2De%2C%20often%20translated%20as,peaceful%20rule%20of%20the%20Shoguns>

Wanczura, D. (2003). Japanese Tattoo Art and Ukiyo-e. [https://www.artelino.com/articles/japanese\\_tattoo\\_art.asp](https://www.artelino.com/articles/japanese_tattoo_art.asp)

Zealand Tattoo. (2014, December 29). A History of Japanese Tattooing. <https://www.zealandtattoo.co.nz/blog/history-japanese-tattooing/>

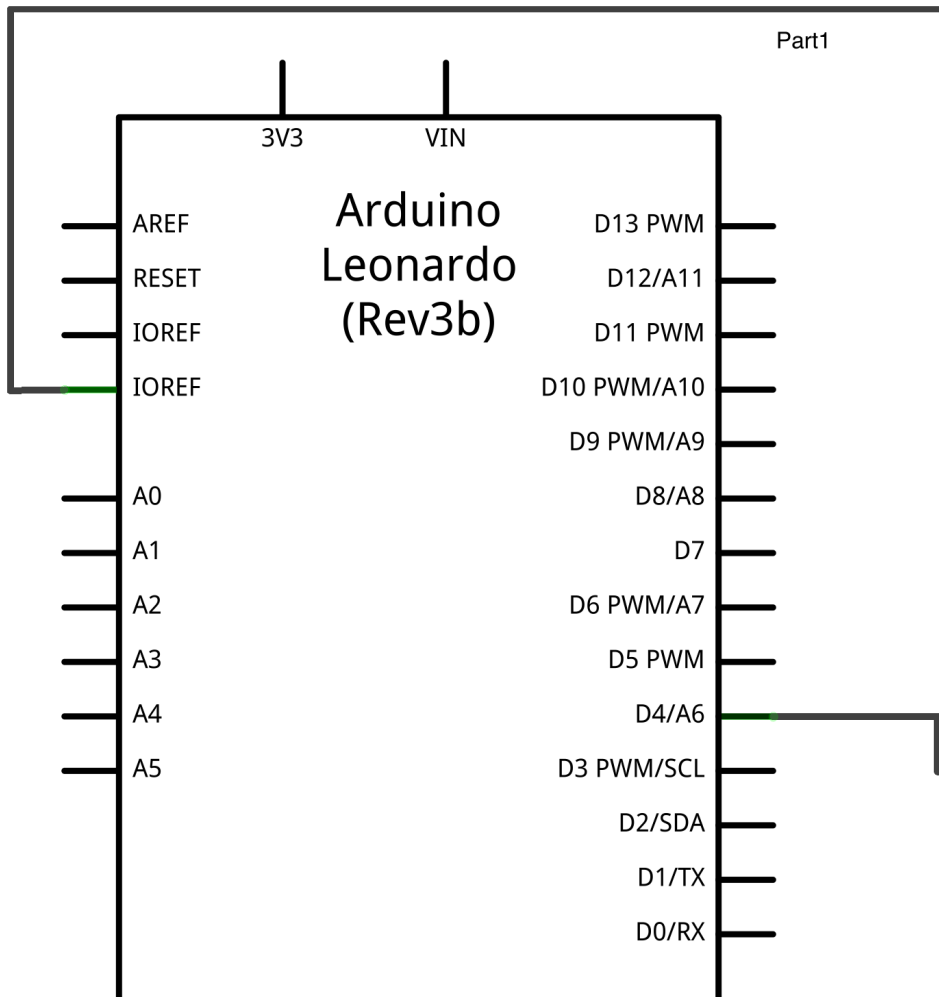
# APPENDIX

```
Arduino UNO R4 WiFi
ba_buttons.ino
13 modified 27 Mar 2012
14 by Tom Igoe
15 modified 11 Nov 2013
16 by Scott Fitzgerald
17
18 This example code is in the public domain.
19
20 https://www.arduino.cc/en/Tutorial/BuiltInExamples/KeyboardMessage
21 */
22
23 #include "Keyboard.h"
24
25 const int buttonPins[] = {2, 3, 4, 5, 6}; // input pins for pushbuttons
26 int previousButtonStates[] = {HIGH, HIGH, HIGH, HIGH, HIGH}; // for checking the states of the pushButtons
27 char keyMapping[] = {'a', 'b', 'c', 'd', 'e'}; // corresponding keys for each button
28
29 void setup() {
30     // make the pushButton pins inputs:
31     for (int i = 0; i < 5; i++) {
32         pinMode(buttonPins[i], INPUT_PULLUP);
33     }
34     // initialize control over the keyboard:
35     Keyboard.begin();
36 }
37
38 void loop() {
39     // iterate over all button pins
40     for (int i = 0; i < 5; i++) {
41         // read the pushbutton:
42         int buttonState = digitalRead(buttonPins[i]);
43         // if the button state has changed,
44         if ((buttonState != previousButtonStates[i)
45             // and it's currently pressed:
46             && (buttonState == HIGH)) {
47             // type out the corresponding key
48             Keyboard.print(keyMapping[i]);
49         }
50         // save the current button state for comparison next time:
51         previousButtonStates[i] = buttonState;
52     }
53 }
54
```

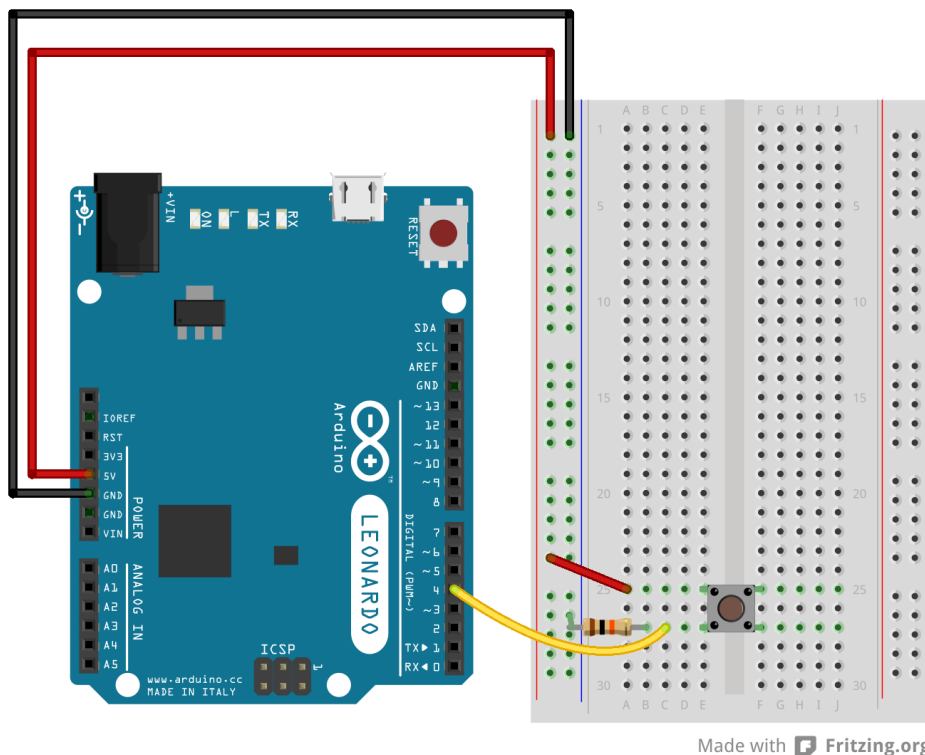
Output Serial Monitor x

## Appendix 1, Cod





Appendix 2, Schematic



Appendix 3, layout Arduino





Title: Circle of Ink – Immersive Tattoo Experiences with Personal Stories

Author: Nanthatchaporn Janthasom

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