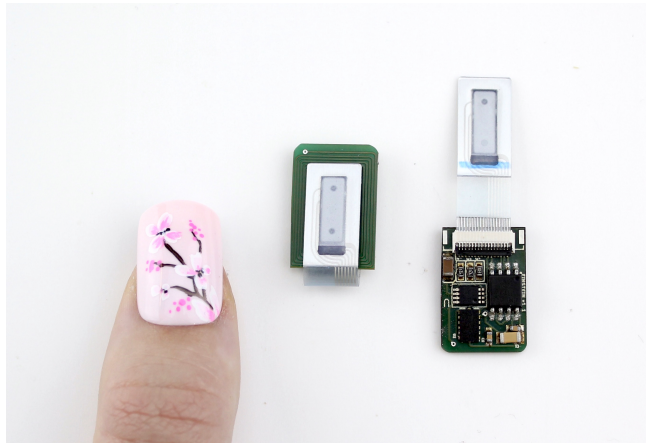


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# Wearables Should Transcend Cultural Norms and Practices

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**Figure 1:** Custom designed PCB approximating the form of a false fingernail.

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*CHI'18* Workshop on (Un)Acceptable?!—Re-thinking the Social Acceptability of Emerging Technologies, April 21, 2018, Montreal, QC, Canada.

## Abstract

Designing socially acceptable technology is especially important in the case of wearables, where devices are personal, yet often visible to the public in terms of form-factor and interaction modality. While taking inspiration from existing cultural norms and practices can lower the barrier for adoption, and increase the social acceptability of new wearable devices, these devices should transcend those very norms by offering new affordances and abilities outside of existing social practices. We argue that wearables provide an opportunity to rethink and design a new landscape of social norms. In particular, we focus on Cosmetic Computing devices that fuse existing cosmetic practices with new materials and fabrication techniques to expand the landscape of wearable devices.

## Author Keywords

Wearables; cosmetic computing; social acceptance; ambient displays.

## ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]: Miscellaneous.

## Introduction and Motivation

Over the past few years, wearable technologies have seen massive growth, adoption, and platform diversification;



**Figure 2:** HäiriÖ shape changing capabilities.

however, many of these devices, most famously Google Glass, have been deemed socially inappropriate and are rarely seen outside of Silicon Valley and other technological hubs. Designers can counteract this by designing for social acceptability, rather than for usability. While important in all forms of technology, social acceptability is especially important in the case of wearable technology, where devices are personal, yet often visible to the public in terms of form-factor and interaction modality.

One way to design for social acceptability is to take inspiration from existing cultural norms and practices. This applies to form factors, as well as interaction modalities. For instance, a wearable device in the form of a scarf is socially acceptable because scarves are socially acceptable. Additionally, interacting by tapping your fingers or twirling your hair is natural, embodied, and inherently socially acceptable. While taking inspiration from existing cultural norms and practices can lower the barrier for adoption and increase the social acceptability of new wearable devices, these devices should transcend those very norms by offering new affordances and abilities outside of existing social practices. In some instances, new capabilities can influence user perception of the very cosmetic form factor that the device is emulating. We base our argument around the design and creation of exemplar Cosmetic Computing prototypes.

### Cosmetic Computing

*Cosmetic Computing* is a vociferous expression of radical individuality and an opportunity for deviance from binary gender norms. It is a catalyst towards an open, playful and creative expression of individuality through wearable technologies. It's a liberation call across gender, race, and body types. Leveraging the term "cosmetics", originally

meaning "technique of dress", we envision how intentionally designed new-wearables, specifically those that integrate with fashionable materials and overlays applied directly atop the skin or body, can (and should) empower individuals towards novel explorations of body and self expression. Unlike many modern traditional cosmetics that are culturally laden with prescriptive social norms of required usage that are restrictive, sexually binary, and oppressive [10], we desire a new attitude and creative engagement with wearable technologies that can empower individuals with a more personal, playful, performative, and meaningful "technique of dress" — *Cosmetic Computing*.

### Beauty Technology & Hybrid Body Craft

Cosmetic Computing is related to the work of Vega and Fuks on Beauty Technology [9] that merges technology with beauty products, as well as the work of Kao on Hybrid Body Craft [4] that incorporates technology with existing practices of decorating, ornamenting, and modifying the body. These emerging areas utilize already culturally accepted practices, such as makeup [9, 7], temporary tattoos [8, 6], and artificial fingernails [9, 5] as sites for technology.



**Figure 3:** HäiriÖ color changing capabilities.

### Exemplar Prototypes

**AlterNail** (False Fingernails). AlterNails are small interactive devices that attach to fingernails with



**Figure 4:** AlterWear shoe prototype.



**Figure 5:** AlterWear hat prototype.

commonly available acrylic nail glue (Figure 1). Each AlterNail has a small e-ink display that is always available and easily glanceable. As objects are touched and handled, the AlterNail is powered wirelessly via inductive coupling. The AlterNail performs simple sensing and computation based on the application, updating the e-ink display as appropriate. AlterNails assume the culturally prevalent form factor of false fingernails; they are similar in size and application to the cosmetic extension. Additionally, AlterNails enable embodied interactions with everyday objects through physical touch, while augmenting the user with new interaction capabilities. Published in CHI'17 [1].

**HäirIÖ** (Hair Extensions). HäirIÖ consists of electronic hair extensions that augment hair with touch input and visual output. HäirIÖ uses thermochromic pigments and SMA to output visible change in color and shape, reflecting and enhancing the natural and cultural malleability of hair (Figures 2 & 3). Additionally, HäirIÖ uses Swept Frequency Capacitive Sensing to interpret how users interact with the extension, affording natural and embodied interaction in the form of touching, stroking, twirling, and styling hair. Published in TEI'18 [3].

**AlterWear** (Dynamic Clothing and Accessories). AlterWear combines NFC and e-ink technologies to enable battery-free, dynamic wearable displays. These displays can be incorporated into a number of different form factors, and fuse interaction, information, and fashion while remaining lightweight and low maintenance. While AlterWear can take many forms, we chose to closely approximate existing clothing and accessories to support adoption and social acceptability (Figures 4 & 5). While not inherently cosmetic in nature, we believe that AlterWear can inspire and inform the creation of *Cosmetic Computing* form factors [1]. Forthcoming in CHI'18 [2].

## Initial Reactions from Users

Perhaps the most telling is our interactions with users throughout various user studies of our exemplar prototypes. Participants in our study of fingernail technology universally appreciated the natural interaction modalities supported by the device. Additionally, several participants viewed the device as “extension of self”, rather than a discrete wearable.

I wouldn't have to worry about [AlterNail] everyday: having to charge it, or having to remember to put it on. Especially for me, with my [prosthetic] leg, it's like all these pieces kind of have to come together everyday, so one less thing to worry about would be nice.

Participants in our study of HäirIÖ were particularly impressed with the natural appearance and interaction modalities of the wearable.

It seems like [HäirIÖ] is a part of you.

Another participant immediately began twirling and stroking the hair, saying:

[HäirIÖ] doesn't feel unnatural. My body is just immediately accepting of it, like, “yes, I'd like to play with it now.” My body definitely keyed into it naturally: “Oh, hair.”

Participants from our study of AlterWear appreciated that the technology was seamlessly integrated in a familiar form factor.

It's not something I would have to wear on top of something else, like you have to wear your shoes.

Overall, our participants from various user studies have been remarkably receptive to new wearable devices in cosmetic form factors.

## Conclusion

Designers developing for social acceptability should leverage existing cultural practices, yet provide functionalities and affordances that transcend those very norms. For wearables in particular, familiar form factors and natural interactions that foreground the physical affordances of the body can lower the barrier for adoption, and increase the social acceptability of new wearable devices.

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