

# AromaCare: Therapeutic Olfactory Experiences for Ongoing Living and Dying Well

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Digital olfaction offers a wealth of experiences. The olfactory design space presents opportunities to "materialise our most fleeting, illogical, deepest thoughts" [3], identify environmental risk [5], bind us to our environment [8], or inform ethical considerations during technology design [9]. Tolaas, in Jones, argues that the study of smell leads to the very "essence of human culture itself" [6]. However, the olfactory sense analysis has been intellectually under-cultivated, and the nose judged too subjective as a scientific instrument[1]. The author is interested in exploring how HCI design researchers employ aromatherapy traditions, developed as a holistic health modality to support the body's balance and innate ability to heal. There is a need to better understand the role of aromatherapeutic, synergistic blending according to the chemical components of essential oils, and how this can contribute to olfactory experiences for sensing wearables in contexts of care. With multiple pathways into the body, olfactory materialities in aromatherapy-based regimens can be employed in technology design, presenting ways to design therapeutic digital olfactory experiences and applications. This research aims to establish holistic restorative olfactory practices in the discussion of a broadened perspective in designing and evaluating olfactory technologies that cultivate and reconstruct contexts and applications for "living and dying well" [4].

**CCS CONCEPTS** • Human-centered computing→Interaction techniques

**Additional Keywords and Phrases:** olfactory design, aromatherapy, care, wearables, scent-based interaction

## INTRODUCTION

In recent times, HCI research examines varied modes of digital olfactory technology for aromatics. Aromatherapy refers to the therapeutic use of essential oils of plants for their pharmacological properties [17], and encouraging wellbeing [14]. Essential oils, custom blended in aromatic synergies based on their chemical constituents, invoke specific physical and psycho-emotional effects. Twelve (12) chemical families define these constituents in Functional Group theory (FGT), a framework extended by Schanabault to categorise and blend by aromatic compounds [15]. With origins in traditional plant medicine and vitalism, aromatherapy involves a multi-layered material-aesthetic that weaves the scientific, the therapeutic, and the storied. Building on aromatic traditions from perfumery [13] to olfactory art [22], I offer aromatherapy as an alternative, analytical lens on olfactory development for digital devices. Extending Donna Haraway's notion of "living and dying well" [4]— a "sensual molecular curiosity" that drives organisms to enfold and interpenetrate through one another as the impulse of living and dying on earth— to suggest that essential oils not only support physiological and psycho-emotional concerns. The essential oils present multispecies crossings with the plants to which we are acquainted, and shape "sympoetic arrangements" that cultivate ongoing "living and dying in beauty" (Haraway).

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Smell's connection with the limbic system, memory, emotion, and instinctive behaviours is well documented in HCI and beyond. However, what is less represented, is how multiple pathways of essential oils into the body can mitigate physiological and psycho-emotional ails using digital interfaces; reproduction, tissue repair, digestion, breath, heart rate, our tears. An aroma therapeutic-led inquiry makes two contributions to HCI literature. First, this research investigates how to broaden our understanding of digital olfactory design work by considering a multi-layered aesthetic. For example, it allows us to recognise the individual chemical constituents of essential oils as sympoetically collaborative with the body, stirring specific bodily responses to blends of aromatic materials. Second, this view advances discussions in olfactory technology design, leaning into its holistic principles, practices and tools of aromatherapy knowledge. Together, these contributions frame a shift beyond building what is possible regarding olfactory design features and functions. A shift towards considering what Haraway, drawing on Tsing, views as "response-ability in unexpected company"[4]. This notion points to an important pre-requisite for ongoingness, deciding to emphasise and nurture development towards contexts of care.

In the following sections, exploratory studies follow on from the trajectory of prior olfactory wearables research, introducing synergistic aromatic blending for physiological sensing wearables. Developing scent-led design methods to make-with people bring olfactory lived experiences to the fore. Participant's affective dispositions to the natural environment emerge through enhanced awareness of the qualities of specific plants. Through people's stories around inhaling, ingesting, and absorbing plants through the skin, the sympoetic arrangements that Haraway draws our attention emerge. This approach draws on critical design practice to understand the ways plant materials conspire the kind of sensual molecular collaboration with the physiological body Haraway speaks of, more comprehensively. Based on research in a three-month aromatherapy training, the next step is to integrate technical therapeutics of essential oil synergies in wearables development. Building on the varied aromatic traditions—aromatherapy, perfumery, olfactory art— patterns of therapeutic olfaction design for wearables emerge.

## **RELATED WORK**

The breadth of interest in HCI literature orients toward practices for digital olfactory design space for wearables. Briefly examining the divergent aromatic practices in histories of olfactory wearables; aromacology [16], essential oils [2], olfactory art [22], and perfumery [10]. This review is partial, foregrounding the multiple concerns that motivate the theorising of olfactory display in HCI. Specifically, key themes in aromatherapy are relevant to this work— digital olfactory systems design— and basic notions of the physiological pathways of scent. The FGT categorisation of essential oil chemical constituents ascribes molecular similarities to predict generalised pharmacological properties. In recent years, FGT has been scrutinised and challenged by researchers [18], who regard the FGT tool as an oversimplification that does not account for the complexities of molecular features of essential oils, particularly when used in synergy. Despite concerns, the twelve functional groups are the prominent, referenced nomenclature across aromatherapy literature and practice.

For Rhind [14], aroma for wellbeing circumscribes; human needs, the content mind immersed within nature (biophilia), landscaping for wellbeing, and spiritual practices where scent extends a tangible dimension to the unseen. Essential oils, comprised of aromatic plants, support calm, wonder, creative engagement, and awareness during immersion in the natural world. This understanding guides a targeted training of the olfactory palette known as horticultural and garden therapy [23,24]. More recently, expert noses call attention to the value of smell training for people affected by COVID-19-related anosmia [20,21]. It is important to reassess the popular assumptions which undermine the biological significance of the sense of smell. Smell determines our ingestive behaviour, aversion to hazards [5], biological communications through personal odour [19], and immune function. Both Rhind's and Tolaas' arguments are useful because they work to enrich, question, and move beyond the pharmacological, semantic, hedonic and suggestive mechanisms that determine the discourse in the perception of smells.

## **METHOD**

This approach follows prior research that employs a critical design practice to create a series of olfactory wearables prototypes for wireless communication infrastructures [11], which employs the nose to scrutinise ethical concerns, emotional and hedonic responses crucial to articulate during networked technology development. Exploratory studies involved a series of e-textiles-led, synaesthetic design inquiries for an EEG-sensing digital olfactory wearable, a virtual design workshop, and professional aromatherapy training. The objective was to gather prior research aligned with the aesthetic traditions of perfumery and olfactory art and consider therapeutic and restorative olfactory practices for care and wellbeing.

Firstly, the work presented in this paper builds on top of an earlier exploration of olfactory display that uses a brain-computer interface and integrates social applications. The technology, a wirelessly networked wearable leather harness with integrated olfactory output, uses a consumer EEG sensor (MUSE headband) to detect the brain's electrical activity and display these states as an immersive scent program. It utilises five (5) consumer glass and metal vials, combined with a heating element, air pump and glycerin-based fragrance to compose accords of aroma chemical and essential oil vapour trails. AURA has been presented in various contexts and forums; immersive performance, neuroscience hackathons, as protective garment style. Secondly, an introductory virtual design workshop recruited three (3) participants with a professional background in technology design and a knowledge proficiency working with olfaction. The workshop employed olfactive-led design speculation to imagine narratives for AURA as a face-worn protective technology in the context of COVID-19 [11], participate in 'do it' instructions [12] based on the artistic practice of the event score [7], and interviews. Finally, the author attended online aromatherapy classes as a primary research site, training in aromatherapy for an average of two days per week over three months. In order to build an account of practice-led research, ongoing e-textile and aromatherapy formulation activities were documented with video-cued observation, handwritten notes, sketches, digital photos and formulations served to record reflexive interactions.

## **DISCUSSION**

According to their chemical constituents, the AURA technology, re-engineered through the lens of aromatherapy and equipped with 3-5 different essential oils in synergy, intends to support physiological and emotional positive states for the wearer. With multiple pathways into the body, essential oils in aromatherapy-based regimens present therapeutic digital olfactory interactions, experiences and applications. These include; dermal applications (skin), inhalation that connects to the lungs (respiratory), and inhalation that connects olfactory electro-neurological signalling with our hormones (olfactory). For example, a wearable application for the respiratory system would employ a different key group of chemical constituents to support sedation, focus, or decongestion experiences. While a skin-based, dermal application wearable device could work to support wound healing or soothe muscular-skeletal tension.

In this preparatory workshop study, it was clear that participants associate positive emotional states with immersion in nature and preference for making design prototypes with botanical aromatics. This observation points to gaps between current olfactory display design, how the chemical constituents of essential oils impart specific physiological and emotional changes, and the semantic, hedonic associations odours carry. The approach showed its potential to radically re-engineer design applications by adopting aromatherapeutic practices, to evolve olfactory interaction beyond function and features. Based on these observations, ecological empathy and understanding play a significant role in our physical and emotional experiences, even such artifacts' safety. The scope of aromatherapeutic blending of essential oils as a lens for digital olfaction development offers a vital concern to address, aimed at developing HCI olfactory design to issues of care.

In the first workshop design activity, participants put the practice to use by connecting to the tonalities of their regional atmosphere. In the following example from the workshop interviews, a participant located in Berlin, Germany, describes this process:

*"I walk ten minutes to the Schrebergarten entrance before removing my mask. The first smell that hits me is linden (lime) tree blossoms. It hangs pungent in the moist air. The cool breeze brings with it the hint of rain somewhere in the distance and occasionally, when sheltered, the ozone-like dusty warmth from sun-heated asphalt."*

This depiction of the decision to walk to a garden belies the nuances of plants and atmosphere aromatics in a person's daily life during COVID-19 shelter in place restrictions and the mandated wearing of protective face coverings. Based on this observation, the process of horticultural therapy, where gardening activities improve people's body, mind and spirit, can further inform immersive applications.

Essential oils are materially implicated in global systems of production. At present, this research is not well resourced to negotiate material sustainability concerns in the essential oil supply chain; critically endangered plants subject to land clearing, biodiversity loss and indigenous knowledge appropriation. Attention to ethical and environmental challenges alongside its medicinal and therapeutic emphasis will enrich this exciting development space. Throughout this study, aromatherapy offers a valuable set of practices and tools. Looking forward, this work offers an alternative way of thinking about olfactory design in HCI— one receptive to ideas of care, nurture, therapy. The limitation of this approach is a small study. In future studies, this exploratory study will be developed into design methods that consider olfactory displays for the future of clinical aromatherapy, aged and palliative care, mental health and wellness, landscape architecture and garden therapy. By proposing digital olfactory systems based on aromatherapeutic synergies and the skillset of aromatherapists to craft healing aromas for wearables, the author hopes to open the discussion of a broadened perspective where designing and evaluating olfactory technologies cultivate and reconstruct contexts and applications for 'living and dying well' [4].

#### **ACM Reference Format:**

First Author's Name, Initials, and Last Name, Second Author's Name, Initials, and Last Name, and Third Author's Name, Initials, and Last Name. 2018. The Title of the Paper: ACM Conference Proceedings Manuscript Submission Template: This is the subtitle of the paper, this document both explains and embodies the submission format for authors using Word. In Woodstock '18: ACM Symposium on Neural Gaze Detection, June 03–05, 2018, Woodstock, NY. ACM, New York, NY, USA, 10 pages. NOTE: This block will be automatically generated when manuscripts are processed after acceptance.

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