

Smelling by Design: A Human-Centred Approach to Digital Scent Technology

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The sense of smell is one of the most powerful and intimate of human senses, deeply tied to memory, emotion, wellbeing, and identity. Yet it remains the most underexplored modality in human-computer interaction (HCI). Building meaningful digital scent technology requires more than engineering advances in scent delivery; it demands a fundamental understanding of how people actually experience smell in their everyday lives.

This talk presents a human-centred research programme at the intersection of HCI, multisensory experience design, and novel device development, with smell as its primary focus. Drawing on more than a decade of interdisciplinary work, it explores how smell, alongside taste and touch, can be established as a legitimate interaction modality in computing. A central argument is that technology cannot be designed in isolation from the human experience it engages: physiology, perception, and lived experience must go hand in hand [4]. The talk showcases novel olfactory devices and interfaces that enable the precise delivery and control of scent stimuli [2] across multiple application scenarios [1], thereby mapping the olfactory design space [3]. Two applied directions anchor the discussion: smell training for olfactory rehabilitation and scent technology for sleep enhancement and broader wellbeing. Together, these illustrate a core design philosophy: effective digital scent technology must be grounded in empirical understanding of human olfactory perception, sensitive to individual and cultural variation, and shaped by the people it ultimately serves. The talk closes with open challenges for the field, from standardisation and personalisation to ethical considerations in scent-mediated interaction, inviting dialogue on how the digital scent community can build bridges between technical innovation and human experience.

References

- [1] Besevli, C., Brianza, G., Dawes, C., Mathur, S., Beganovic, S., Boak, D., Schieck, A., Lechner, M., Maggioni, E., Philpott, C., & Obrist, M. (2026). Digital Intervention for Smell Training: A Real-World Study on Engagement, Adherence, and Behavioural Dynamics. *Rhinology Journal*. DOI: 10.4193/Rhin25.290.
- [2] Hopper, R., Popa, D., Maggioni, E., Patel, D., Obrist, M., Landis, B.N., Hsieh, J.W. & Udrea, F. (2024). Multi-channel portable odor delivery device for self-administered and rapid smell testing. *Nature Communication Engineering*, 3(1), 1–8.
- [3] Maggioni, E., Cobden, R., Dmitrenko, D., Hornbæk, K. & Obrist, M. (2020). SMELL SPACE: Mapping out the olfactory design space for novel interactions. *ACM Transactions on Computer-Human Interaction*, 27(5), 1–26.
- [4] Velasco, C. & Obrist, M. (2025). *Multisensory Experiences: Where the Senses Meet Technology* (2nd edition). Oxford: *Oxford University Press*. ISBN 978-0-19-888670-9.