



# Sensing Heritage

Exploring Creative Approaches for Capturing, Experiencing and Safeguarding the Sensorial Aspects of Cultural Heritage

Sophia Ppali  
CYENS Centre of Excellence  
University of Kent  
s.pпали@cyens.org.cy

Marina Pasia  
CYENS Centre of Excellence  
Cyprus University of Technology  
pasiamarina@gmail.com

Sara Wolf  
Julius-Maximilians-Universität  
sara.wolf@uni-wuerzburg.de

Jihae Han  
KU Leuven  
jihae.han@kuleuven.be

Reese Muntean  
Simon Fraser University  
reese\_muntean@sfu.ca

MinYoung Yoo  
Simon Fraser University  
minyong\_yoo@sfu.ca

Kasper Rodil  
Aalborg University  
kr@create.aau.dk

Arne Berger  
Anhalt University of Applied Sciences  
Arne.Berger@hs-anhalt.de

Andreas Papallas  
CYENS Centre of Excellence  
University of Oxford  
a.papallas@cyens.org.cy

Luigina Ciolfi  
University College Cork  
LCiolfi@ucc.ie

John Stevens  
Royal College of Art  
john.stevens@rca.ac.uk

Alexandra Covaci  
University of Kent  
a.covaci@kent.ac.uk

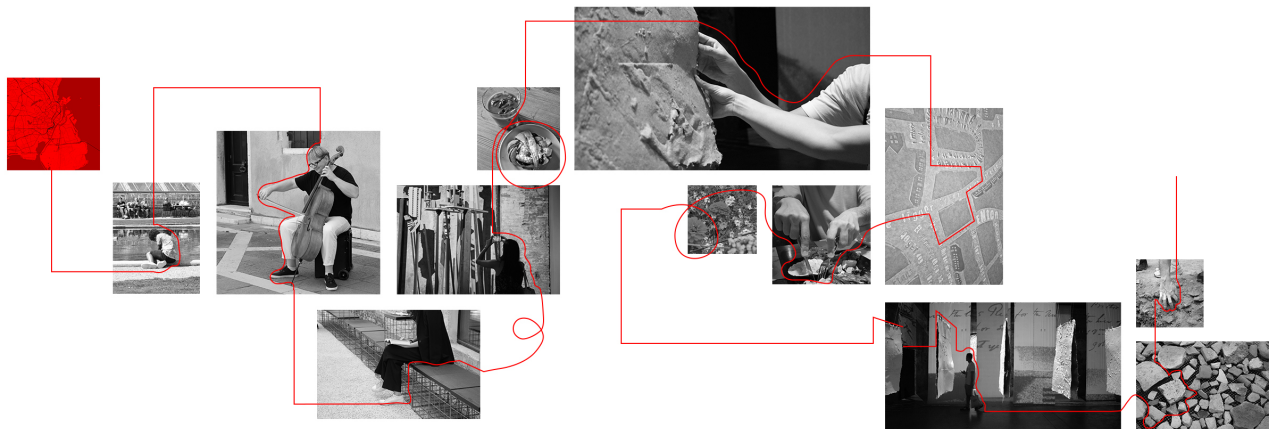


Figure 1: Sensing heritage: a workshop at DIS 2024

## ABSTRACT

Whilst there is increasing work investigating the role of digital documentation, interpretation, and augmentation of cultural heritage, such interventions have largely focused on visual and sometimes auditory modalities, neglecting the full spectrum of human senses.

With this workshop we seek to bring together an interdisciplinary group of researchers, designers, practitioners and community members to explore creative approaches for documenting and experiencing cultural heritage's rich sensory dimensions extending beyond visual-based approaches to encompass sound, smell, taste, and touch. The workshop directly aligns with the conference's exploration of "Why Design?" by utilising design as a powerful, empathetic, and participatory tool for safeguarding cultural heritage. Our goal is to extend our understanding of concepts, methods and technologies for capturing and experiencing sensory heritage, advocating for a holistic approach that celebrates and communicates



This work is licensed under a Creative Commons Attribution International 4.0 License.

DIS Companion '24, July 01–05, 2024, IT University of Copenhagen, Denmark  
© 2024 Copyright held by the owner/author(s).  
ACM ISBN 979-8-4007-0632-5/24/07  
<https://doi.org/10.1145/3656156.3658400>

the profound sensory diversity of human cultures, inspiring a shift in how we document, interpret and share cultural heritage.

## CCS CONCEPTS

• **Human-centered computing** → **Systems and tools for interaction design.**

## KEYWORDS

Heritage, Multisensory experiences, Documentation, Senses

### ACM Reference Format:

Sophia Ppali, Marina Pasia, Sara Wolf, Jihae Han, Reese Muntean, MinYoung Yoo, Kasper Rodil, Arne Berger, Andreas Papallas, Luigina Ciolfi, John Stevens, and Alexandra Covaci. 2024. Sensing Heritage: Exploring Creative Approaches for Capturing, Experiencing and Safeguarding the Sensorial Aspects of Cultural Heritage. In *Designing Interactive Systems Conference (DIS Companion '24)*, July 01–05, 2024, IT University of Copenhagen, Denmark. ACM, New York, NY, USA, 4 pages. <https://doi.org/10.1145/3656156.3658400>

## 1 BACKGROUND AND MOTIVATION

With this workshop, we seek to explore creative approaches for capturing and experiencing the rich sensory aspects of heritage, extending beyond visual-based approaches to encompass sound, smell, taste, and touch. Within HCI, cultural heritage represents a multifaceted area of study, which includes the investigation of how digital technologies influence human engagement within environments where heritage is experienced and the creation of interactive tools to aid in heritage documentation, interpretation [6] and safeguarding. Cultural heritage takes many forms [18] encompassing *tangible elements*, such as historical sites, monuments, artefacts; and *intangible elements*, such as language, performances, culinary practices, rituals, traditions, or human-environment relationships [1]. The way heritage is accessed, documented, showcased, and sometimes governed spans a wide range of stakeholders, including local, professional, and community-based groups, all aimed at enriching the broader cultural landscape. Heritage is not just preserved, but also lived, discussed, and recreated, thereby fostering self-respect and a sense of belonging, cultivating education and knowledge as well as sparking inspiration, and creativity [30].

Legal frameworks for heritage protection have historically guided the evaluation (and safeguarding) of the aesthetic, historical, social and scientific value of cultural landscapes, highlighting both tangible and intangible aspects [27], recognising the importance of diverse sensory dimensions in defining cultural significance across time [9]. Additionally, the embodied experience of space in locations where heritage is experienced (e.g., museums, outdoor heritage sites) through walking, talking, listening, touching, and the nuanced physiology of affect—plays a critical role in sense-making [14]. However, a review of sensory and multisensory heritage research uncovers a pronounced bias towards the visual and, in some cases, auditory senses, with other sensory experiences, especially smell, taste, and touch, being notably neglected [25]. This imbalance overlooks the power of all our senses to connect us with our past and fails to leverage the full potential of sensory heritage experiences in fostering cultural empathy, personal interpretations, emotional connections, community engagement, and sustainable

practices [12, 14]. It is therefore important to establish methodologies and tools for the documentation, sharing and safeguarding of cultural heritage, that broaden the scope of our sensory engagement with its diverse (cultural) contexts.

Documenting and disseminating the full spectrum of sensory experiences in digital heritage presents distinct challenges that span technical, ethical, and interpretative domains. These challenges are particularly pronounced when attempting to capture the essence of cultural heritage and ensure its accessible and authentic representation to a broader audience. One of the primary documentation challenges revolves around authority and representation. Questions about who decides which aspects of culture are documented and in which way are critical, as emphasised in [28]. The predominance of technology from dominant societies can skew the documentation and interpretation processes, potentially misaligning with the sensory essence of the subjects being documented. Another significant challenge is capturing the rich sensory dimensions of cultural heritage [11]. These sensory elements are deeply influenced by personal experiences and cultural contexts, making standardised documentation difficult. Sensory experiences can also be fleeting and subject to change, demanding innovative methods for their authentic documentation. Engaging communities through fieldtrips and fieldwork [2, 10, 15, 29], participatory design [5, 13, 19, 32] or sensory ethnography [17] is crucial in this regard, as it allows these communities to transition from information sources into active participants, who dynamically engage with the heritage. However, work in this area presents also a series of challenges when it comes to sustaining engagement beyond the limitations of funding cycles and reaching out to disenfranchised communities who may have other pressing concerns.

The dissemination of sensory experiences adds to the discourse its own set of challenges, primarily due to technological limitations [8, 31]. While technology facilitates the capture and sharing of visual and auditory elements, replicating or conveying soundscapes, smells, tastes, and touch in digital spaces remains complex. Moreover, interpreting sensory data and presenting it to the public requires careful consideration to ensure authenticity and meaningful engagement. Utilising tools like interactive narratives [3, 4, 16], tangible exhibits [22, 23], sensory maps [20, 21], and multisensory storytelling [7, 24], can help present cultural heritage in ways that resonate with both the community who treasure the heritage and wider audiences who experience it. These approaches could provide more immersive and authentic representations of cultural heritage, while challenging HCI researchers and practitioners to develop methodologies and technologies that bridge the gap between the rich human sensory experience and current technological capabilities.

With our workshop we seek to bring together an interdisciplinary community of researchers, designers and practitioners to share knowledge, strategies, and best practices for capturing, experiencing, and sharing the sensory aspects of heritage, discussing both technological and non-technological methods, practices, and concerns to make these aspects accessible and engaging for all. Our objectives include:

- Broaden the scope of heritage documentation, interpretation and safeguarding to include the full range of sensory experiences, acknowledging the depth and richness of cultural heritage.
- Explore new methodologies and technologies that can capture and convey the sensorial dimensions of heritage beyond visual-centric approaches, making these experiences accessible to wider audiences.
- Investigate how communities can collaborate in documenting and interpreting, while also benefit from sharing their own sensory heritage.
- Engage in reflexive discussions on the role of design and technology in enhancing our understanding and appreciation of the sensory aspects of heritage, contributing to their sustainable safeguarding and transmission to future generations.

The workshop proposal directly responds to the conference's call to explore "Why Design?" by embracing design at its best, as an empathetic and participatory tool, vital for understanding heritage in its fullest form. Through our workshop, we will examine and apply design practices in safeguarding the diverse expressions, practices, and knowledge that constitute the multisensory aspects of heritage. We hope to inspire a shift in how heritage is perceived, documented, and preserved, ensuring that the full richness of human cultures is acknowledged, celebrated, and conveyed in all its sensory diversity.

## 2 WORKSHOP THEMES

In this workshop, we aim to discuss and explore concepts, technologies, methods, and applications related to multisensory documentation and experience of heritage – from an HCI perspective and beyond. Grounded in the Danish context of Copenhagen, a settlement documented to be 6.000 years old, our workshop will provide a vibrant environment of tangible and intangible heritage as excellent case study for participants to dive into. We will investigate some of the following questions, grouped into four themes:

- **Sensory experiences in cultural heritage.**  
How can we effectively record, map, and convey the rich multisensory dimensions of cultural heritage? What methodologies and technologies are most effective for documenting the non-visual aspects of cultural heritage, such as sound, smell, taste, and touch? What are the experiences and challenges faced in creating multisensory heritage and museum experiences that facilitate deeper engagement and understanding of cultural heritage?
- **Community engagement and participatory design.**  
In what ways can we collaborate with communities to document and safeguard their unique cultural practices through multisensory methods, ensuring their active involvement and accurate representation? What strategies can be developed to involve communities in creating dynamic, sensory-rich archives that contribute to the living history of their cultural heritage?
- **Technology for multisensory heritage.**  
How can digital and sensory technologies be used to create interactive, living archives that engage individuals with

cultural heritage in an immersive way? What role can emerging technologies (e.g., Generative Artificial Intelligence/ Machine Learning / Internet Of Things / Immersive Technologies) play in transforming static archives into living, sensory experiences that encourage active participation and learning?

- **Accessibility and inclusivity.**

What approaches can be adopted to develop accessible and inclusive experiences of cultural heritage, catering to the diverse sensory needs and preferences of a global audience? How can ethical considerations in the multisensory documentation of cultural heritage ensure the respectful and sustainable creation of living archives? What approaches can be taken to balance the preservation of cultural authenticity with the creation of accessible, engaging, and living heritage experiences?

## 3 WORKSHOP FORMAT AND ANTICIPATED OUTCOMES

This one-day workshop is designed to bring together an international and diverse community of researchers, practitioners, students, and community members committed to the innovative safeguarding of the sensory aspects of cultural heritage. Our goal is to facilitate a collaborative environment where participants can explore creative and interactive methodologies for capturing the multisensory dimensions of cultural heritage, ensuring its vitality and relevance for future generations. The workshop will also provide opportunities for participants to reflect on their own experiences with multisensory documentation and safeguarding cultural heritage, through submitting their own case studies.

The workshop will be structured around interactive sessions, hands-on activities, and discussion, ensuring an engaging and productive environment for all participants. The first part will focus on the *key concepts* covered in the workshop, through a keynote presentation and a panel discussion. This will be followed by presentation of the participants work and a collaborative analysis and brainstorming session. The second part of the workshop will be dedicated to *methods of documentation*, through a sensory walk (inspired by smellwalks [26]), allowing participants to engage directly with documentation methods by capturing heritage in Copenhagen. This will be followed by a participatory design activity to get participants thinking about the *design and use of technology* in this context. The final part of the workshop will involve a collective analysis of the insights gathered throughout the day as well as a discussion with the goal to start *mapping out the design space* of sensory heritage. Throughout, the activities will be opportunities for networking, collaborative brainstorming, and the development of future research and project collaborations.

As a result of the workshop, we will produce a living document starting with the case studies presented that the community can continue contributing to, an illustrated workshop manifesto, and an article aimed at policymakers and the general public to sensitise them to documenting and preserving the sensory aspects of cultural heritage. We hope the workshop will enrich our collective knowledge and capabilities regarding heritage documentation and

safeguarding but also inspire new work that honours and sustains the sensory diversity of heritage.

Workshop information and call for participation can be found at: <http://hci.cyens.org.cy/sensingheritage/>

## REFERENCES

- [1] 2003. UNESCO - Text of the Convention for the Safeguarding of the Intangible Cultural Heritage — [ich.unesco.org](https://ich.unesco.org/en/convention). <https://ich.unesco.org/en/convention>. [Accessed 13-02-2024].
- [2] Arne Berger and Dhaval Vyas. 2018. A personal perspective on the value of cross-cultural fieldwork. *Interactions* 25, 3 (April 2018), 61–65. <https://doi.org/10.1145/3194335>
- [3] Ana María Cárdenas Gasca, Jennifer Mary Jacobs, Andrés Monroy-Hernández, and Michael Nebeling. 2022. AR Exhibitions for Sensitive Narratives: Designing an Immersive Exhibition for the Museum of Memory in Colombia. In *Designing Interactive Systems Conference*. 1698–1714.
- [4] Jean Ho Chu. 2016. Design Space for Tangible and Embodied Interaction with Cultural Heritage. In *Proceedings of the 2016 ACM Conference Companion Publication on Designing Interactive Systems*. 27–28.
- [5] Luigina Ciolfi, Areti Damala, Eva Hornecker, Monika Lechner, Laura Maye, and Daniela Petrelli. 2015. Cultural heritage communities: technologies and challenges. In *Proceedings of the 7th International Conference on Communities and Technologies*. 149–152.
- [6] Luigina Ciolfi and Daniela Petrelli. 2015. Walking and designing with cultural heritage volunteers. *Interactions* 23, 1 (2015), 46–51.
- [7] Caroline Claisse, Daniela Petrelli, Nick Dulake, Mark T Marshall, and Luigina Ciolfi. 2018. Multisensory interactive storytelling to augment the visit of a historical house museum. In *2018 3rd Digital Heritage International Congress (DigitalHERITAGE) held jointly with 2018 24th International Conference on Virtual Systems & Multimedia (VSMM 2018)*. IEEE, 1–8.
- [8] Alexandra Covaci, Longhao Zou, Irina Tal, Gabriel-Miro Muntean, and Gheorghita Ghinea. 2018. Is multimedia multisensorial?—a review of mulsimedia systems. *ACM Computing Surveys (CSUR)* 51, 5 (2018), 1–35.
- [9] Danielle Drozdowski, Sarah De Nardi, and Emma Waterton. 2016. *The significance of memory in the present*. <https://researchdirect.westernsydney.edu.au/islandora/object/uws%3A36203/> Book Title: Memory, Place and Identity: Commemoration and Remembrance of War and Conflict Pages: 1-16.
- [10] Huichao Feng, Jieling Xiao, Yun Gao, and Fan Xia. 2022. The meanings, changes, and challenges of the Grandmother’s house in Mosuo vernacular dwellings in Northwest Yunnan. *Interiors* 12, 2-3 (Sept. 2022), 193–220. <https://doi.org/10.1080/20419112.2022.2160135> Publisher: Routledge \_eprint: <https://doi.org/10.1080/20419112.2022.2160135>
- [11] Yumeng Hou, Sarah Kenderdine, Davide Picca, Mattia Egloff, and Alessandro Adamou. 2022. Digitizing intangible cultural heritage embodied: State of the art. *Journal on Computing and Cultural Heritage (JOCCH)* 15, 3 (2022), 1–20.
- [12] Daniela Angelina Jelinić and Matea Senkić. 2019. The value of experience in culture and tourism: The power of emotions. In *A research agenda for creative tourism*. Edward Elgar Publishing, 41–54.
- [13] Gereon Koch Kapuire, Heike Winschiers-Theophilus, Colin Stanley, Shilumbe Chivuno-Kuria, Kasper Rodil, McAlbert Katjivirue, and Ernest Tjitendero. 2014. Community-based co-design in Okomakuara a contribution to ‘design in the wild’. In *Proceedings of the 13th Participatory Design Conference: Short Papers, Industry Cases, Workshop Descriptions, Doctoral Consortium papers, and Keynote abstracts - Volume 2 (PDC '14)*. Association for Computing Machinery, New York, NY, USA, 207–208. <https://doi.org/10.1145/2662155.2662204>
- [14] Jenny Kidd. 2018. ‘Immersive’ heritage encounters. *The Museum Review* 3, 1 (2018).
- [15] PerMagnus Lindborg, Jieling Xiao, Francesco Aletta, Holly Cheung, Ran Yue, Ningze Han, and Xiaoyi Xu. 2023. Exhibition :: The Dual City Multi-sensory Experience of Markets. Record validation is based on the information provided by the researcher(s) concerned. Suggestions for further amendments or supplementary information can be sent to [lbscholars@cityu.edu.hk](mailto:lbscholars@cityu.edu.hk).
- [16] Mayank Loonker, Sophia Ppali, Rocio Von Jungenfeld, Christos Efstratiou, and Alexandra Covaci. 2022. “I was Holding a Magic Box”: Investigating the Effects of Private and Projected Displays in Outdoor Heritage Walks. In *Designing Interactive Systems Conference*. ACM, Virtual Event Australia, 1565–1580. <https://doi.org/10.1145/3532106.3533468>
- [17] Kelvin EY Low. 2015. The sensuous city: Sensory methodologies in urban ethnographic research. *Ethnography* 16, 3 (2015), 295–312.
- [18] David Lowenthal. 2005. Natural and cultural heritage. *International Journal of Heritage Studies* 11, 1 (2005), 81–92. <https://doi.org/10.1080/13527250500037088>
- [19] Zhicong Lu, Peng Tan, Yi Ji, and Xiaojuan Ma. 2022. The Crafts+Fabrication Workshop: Engaging Students with Intangible Cultural Heritage-Oriented Creative Design. In *Proceedings of the 2022 ACM Designing Interactive Systems Conference (Virtual Event, Australia) (DIS '22)*. Association for Computing Machinery, New York, NY, USA, 1071–1084. <https://doi.org/10.1145/3532106.3533525>
- [20] K. McLean. 2019. Sensory maps. Elsevier, 153–168. <https://www.elsevier.com/books/international-encyclopedia-of-human-geography/kobayashi/978-0-08-102295-5> Num Pages: 153 - 168.
- [21] Kate McLean. 2020. Temporalities of the Smellscape: Creative Mapping as Visual Representation. In *Modern Approaches to the Visualization of Landscapes*, Dennis Edler, Corinna Jenal, and Olaf Kühne (Eds.). Springer Fachmedien, Wiesbaden, 217–245. [https://doi.org/10.1007/978-3-658-30956-5\\_12](https://doi.org/10.1007/978-3-658-30956-5_12)
- [22] Reese Muntean, Alissa N. Antle, Brendan Matkin, Kate Hennessy, Susan Rowley, and Jordan Wilson. 2017. Designing Cultural Values into Interaction. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*. Association for Computing Machinery, New York, NY, USA, 6062–6074. <https://doi.org/10.1145/3025453.3025908>
- [23] Reese Muntean, Kate Hennessy, Alissa Antle, Brendan Matkin, Susan Rowley, and Jordan Wilson. 2016. Design Interactions in ‘Belongings’. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems (DIS '16)*. Association for Computing Machinery, New York, NY, USA, 582–594. <https://doi.org/10.1145/2901790.2901912>
- [24] Valentina Nisi, Paulo Bala, Hollie Bostock, Vanessa Cesário, and Nuno Jardim Nunes. 2023. “Before gentrification, we claim for habitation” Eliciting Values and Assets through Cultural Heritage Storytelling. In *Proceedings of the 2023 ACM Designing Interactive Systems Conference*. 2423–2436.
- [25] Murray Parker, Dirk H. R. Spennemann, and Jennifer Bond. 2023. Sensory perception in cultural studies—a review of sensorial and multisensorial heritage. *The Senses and Society* 0, 0 (2023), 1–31. <https://doi.org/10.1080/17458927.2023.2284532> Publisher: Routledge \_eprint: <https://doi.org/10.1080/17458927.2023.2284532>
- [26] Christopher Perkins and Kate McLean. 2020. Smell walking and mapping. In *Mundane methods: Innovative ways to research the everyday*. Manchester University Press, 156–173. <https://research.manchester.ac.uk/en/publications/smell-walking-and-mapping>
- [27] Marilyn Phelan. 1993. A synopsis of the laws protecting our cultural heritage. *New Eng. L. Rev* 28 (1993), 63.
- [28] Kasper Rodil and Matthias Rehm. 2015. A decade later: looking at the past while sketching the future of ICH through the tripartite digitisation model. *International Journal of Intangible Heritage* 10 (2015), 47–60.
- [29] Kasper Rodil, Heike Winschiers-Theophilus, Gereon Koch Kapuire, Colin Stanley, and Shilumbe Chivuno-Kuria. 2014. Participatory exploration of digitalizing cultural content: getting married, are we ready?. In *Proceedings of the 13th Participatory Design Conference: Short Papers, Industry Cases, Workshop Descriptions, Doctoral Consortium papers, and Keynote abstracts - Volume 2 (PDC '14)*. Association for Computing Machinery, New York, NY, USA, 93–97. <https://doi.org/10.1145/2662155.2662185>
- [30] Dallen J. Timothy. 2021. *Cultural Heritage and Tourism: An Introduction*. Channel View Publications. <https://doi.org/10.21832/9781845417727>
- [31] Carlos Velasco and Marianna Obrist. 2020. *Multisensory Experiences: Where the senses meet technology*. Oxford University Press, Oxford England ; New York, NY.
- [32] MinYoung Yoo, Lauren Knight, William Odom, and Arne Berger. 2022. Storywork & Reciprocity: On the Design of an Audio Documentary that Extends HCI Research back to Participants. In *Proceedings of the 2022 ACM Designing Interactive Systems Conference (DIS '22)*. Association for Computing Machinery, New York, NY, USA, 1345–1357. <https://doi.org/10.1145/3532106.3533539>