





# NOSE-FIRST

*Practices of smellwalking and smellscape mapping*

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of the requirements for the degree of  
Doctor of Philosophy*

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## *I Research Abstract*

This thesis examines qualitatively-perceived spatial and temporal characteristics of the olfactory landscape, hereafter known as the smellscape, through mapping practices. Human olfactory perception contributes to our understanding of the world; people delight in localised scents. Slight whiffs can enable pre-visualisation of a forthcoming activity, serve as a summary synthesis of previously-witnessed events and have the capacity to evoke situated memories. However, the smellscape is in constant flux and ephemeral, volatile smells are easy to ignore when experienced by ordinary people in everyday, urban environments. The apparent invisibility of smell as a physical entity, and as a social construct, in the prevailing sensory order has led scholars to call for further studies in how smellscapes may be detected, recorded and shared.

This interdisciplinary, practice-based, communication design research responds to debates in olfactory art and urbanism that highlight the challenges inherent in obtaining and sharing a vast, ephemeral and eye-invisible sensory dataset. Concerned with representation and communication of the smellscape as theorised by J. Douglas Porteous and activated by Victoria Henshaw, the research explores how social performative mapping might contribute to communication of non-visual sensory olfactory information. In so doing it tests existing theories to build a deeper understanding of the smellscape.

The thesis is divided into six chapters and includes two case studies situated in Singapore and Kyiv. Through iteration I test the smellwalk as a data-collection and mapping activity and investigate and record the

spatial and temporal qualities of smell within contemporary, quotidian, urban environments. Drawing on interdisciplinary methods, sensewalking, agentic mapping, rhythm analysis and creative practice, I develop and apply original approaches to practices of smellscape mapping as a means of analysing, interpreting and communicating a theorised fragmentary and episodic olfactory landscape.

The findings include a model of dimensional olfactory space, durational differences in smells between mornings and evenings in single locations, multi-scalar temporalities of a city, polyrhythmic relationships between the situated human body and a range of smells, and a series of projective mappings that render visible olfactory-sensed information. My original contribution to knowledge includes mapping strategies to examine relationships between smells and space, smells and place, smells and time, and smells and people. By providing cohesive approaches and procedures for smell detection and collection, together with symbol sets and processes for the representation of human-experienced smells, I establish practices of smellwalking and smellscape mapping as platforms for conceptualising and sharing the complexity of human-sensed olfactory perception. These practices might be utilised by communication designers, geographers, environmentalists, architects, urban designers, city authorities and arts organisations interested in visualising and communicating situated, human, sensory experience. The work contributes to the nascent field of sensory communication design.

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## *V Author's declaration*

During the period of registered study in which this thesis was prepared the author has not been registered for any other academic award or qualification. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

**Kate McLean**

January 8, 2019

## VI *Terminology: neologisms and terms arising from practices of smellwalking and smellscape mapping*

The portmanteau, smellscape, describes the olfactory equivalent of the landscape. It was first used within human geography by Gade and later comprehensively theorised by J. Douglas Porteous who published it, first as a paper in 1985 and subsequently as a book chapter in 1990.<sup>1</sup> My research uncovered a visual hegemony that extended to language and prompted the generation of neologisms (differentiated by italics) explained in the subsequent glossary. I also include the precise terminology of Henri Lefebvre's Rhythmanalysis that I adopt as a research method in Chapter Five and some specialist cartographic terms.<sup>2</sup> The terms are listed alphabetically within their specialist domains for clarity.

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1 Daniel Gade, 'Redolence and Land Use on Nosy Be, Madagascar', *Journal of Cultural Geography*, 4.2 (1984), 29–40; J. Douglas Porteous, *Landscapes of the Mind: Worlds of Sense and Metaphor* (Toronto; Boston: University of Toronto Press, 1990).

2 Henri Lefebvre, *Rhythmanalysis: Space, Time and Everyday Life* (New York: Bloomsbury Academic, 2013).

## VII Glossary

### CARTOGRAPHY

<b>Cartouche</b>	A space on the map in which the map's title, date of publication, cartographer's name and any sponsors might appear. Also used for inclusion of any explanatory text
<b>Compass rose</b>	Arrows on the map orienting the map reader to cardinal points
<b>Legend</b>	A list explaining the symbols used in the map
<b>Neatline</b>	A border around a map indicating the extent of its coverage

### RHYTHMANALYSIS

<b>Arrythmia</b>	From Rhythmanalysis. First characteristic (of four) of a rhythm as described by Lefebvre: a conflict or dissonance between two or more rhythms
<b>Eurythmia</b>	From Rhythmanalysis. Second characteristic (of four) of a rhythm as described by Lefebvre: a constructive interaction or concordance between two or more rhythms
<b>Polyrhythmia</b>	From Rhythmanalysis. Third characteristic (of four) of a rhythm as described by Lefebvre: a co-existence or layering of multiple rhythms without dissonance
<b>Rhythmanalysis</b>	Essay collection by Lefebvre outlining methods for the analysis of urban spaces, their inhabitants and relationships between

### SMELL

<b>Anosmia</b>	Permanent or temporary loss of the sense of smell. May be congenital or result from injury or infection
<i>Scentscape/scentwalk</i>	Replacement terminology, for smellscape and smellwalk, used in Chapter Four acknowledging cultural preference for odour-based terminology of 'scent' over a perceived pejorative conception of 'smell'
<b>Sensewalk</b>	A research method used to investigate and analyse how human animals experience, understand and utilise space. Conducted through one or more of the senses
<i>Smellfie</i>	Neologism: a self-guided smellwalk, using a free pack of materials available from my website, to understand the theory and practices (included a printable smellnote form)
<i>Smell sketch</i>	Neologism: a quick visual rendering of a smell experience developed in this practice. Usually makes use of watercolour paints to summarise a particular smell or experience of the smellwalk, used both as graphic elicitation and an aide-memoire
<b>Smellscape</b>	The olfactory equivalent of a visual landscape, the odour landscape that surrounds us – a spatial construct that may be embodied, experiential, ingested and immersive, or objectified
<b>Smellscape mapping</b>	An art and design practice that seeks to render visible a collective olfactory environment of the space between a smell source and the human nose
<i>Smellnote</i>	Neologism: a record of a smell experience including at a minimum naming a smell, may also include qualitative datafields to record the intensity, duration, hedonic tone, expectation and association of a smell
<i>Smell visualiser</i>	Neologism: a paper-based grid designed to enable non-specialists to visualise their smell experiences in colour and shape
<b>Smellwalk</b>	A sense-walk in which information received through the nose is foregrounded. Used as a methodology for smellscape mapping and as a mapping practice first mentioned by Porteous, used extensively by Henshaw

## Chapter One

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# Introduction

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## 1.1 *Invisibility and smell*

In the Western world smell has long been conceived as a double-invisible sense. Molecules that trigger a reaction in the olfactory nerve are mostly invisible to the human eye. And, in his writings, Aristotle suggests that human experience of smell is lowly in the sensory order.<sup>3</sup> When smells are understood, based on a visual hegemony, to be invisible, then they might be regarded as being of lesser import. My understanding of smell is as *nose-visible* and yet *eye-invisible*. The main aim of the research is to investigate how smells might be rendered visible both literally and figuratively.

In the 1980s the academy took what Howes refers to as, a 'sensory turn in contemporary scholarship'<sup>4</sup> with history and anthropology as the foundational disciplines inspiring a wealth of related sensory studies across humanities and social sciences including, of particular interest to my research, geography and design. A 2018 exhibition and accompanying publication, *The Senses: Design Beyond Vision*<sup>5</sup> called attention to the range of contemporary multisensory design through works that enriched interactions with the world by fusing mind, body and sensations. The publication in 2017 of an edited collection by Victoria Henshaw, Dominic Medway, Chris Perkins, Gary Warnaby and myself, *Designing with Smell:*

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3 T. K. Johansen, *Aristotle on the Sense-Organs* (Cambridge: Cambridge University Press, 1997).

4 David Howes, 'The Expanding Field of Sensory Studies – Sensory Studies', 2013 <<http://www.sensorystudies.org/sensorial-investigations/the-expanding-field-of-sensory-studies/>> [accessed 28 October 2016].

5 Cooper Hewitt Smithsonian Design Museum, 'The Senses: Design Beyond Vision', *Cooper Hewitt Smithsonian Design Museum*, 2018 <<https://www.cooperhewitt.org/2018/02/27/cooper-hewitt-smithsonian-design-museum-to-present-the-senses-design-beyond-vision/>> [accessed 11 June 2018]; Ellen Lupton and Andrea Lipps, *Senses: Design Beyond Vision* (Hudson, NY: Princeton Architectural Press, 2018).

*Practices, Techniques, Challenges* is testament to the current diversity of resulting design practices incorporating smell.<sup>6</sup> The sensory turn is having an impact, as one contributor, Jim Drobnick, observed, ‘Clearly, the era has passed when smell was held to be inconsequential or frivolous; now scent’s versatility and strengths bring forward possibilities that force a reconsideration of many accepted design practices [...]’.<sup>7</sup>

Why there is increased interest in smell from 2010 onwards remains open to conjecture; but a persuasive argument made by perfumer and olfactory artist Mindy Yang suggests a craving for physical experience increases as more time is spent in digital environments. She writes, ‘Intuitively, we realize that we are starved of certain sensations. With the rise of digital culture, society has, perhaps subliminally, become more interested in the missing sense – what we smell.’<sup>8</sup>

At a physiological level, when humans detect olfactory stimuli their response is a result of a series of interactions. This is explained by Laing, et al. who argue:

Olfactory perception results from a cascade of events beginning with the arrival of airborne odor molecules at the periphery of the olfactory system, and ending in physiological and psychological effects, defining a response to these stimuli [...] In human olfaction the explicit responses are generally verbal, including detection, recognition, discrimination and estimation of odor intensity.<sup>9</sup>

Imagining and creating forms to depict and represent the olfactory qualities of place is the subject of my practice. The purpose of this research is to investigate a variety of mapping practices through which

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6 *Designing with Smell: Practices, Techniques and Challenges*, ed. by Victoria Henshaw, Dominic Medway, Kate McLean, and others (London: Routledge, 2017).

7 Jim Drobnick, ‘Afterword’, in *Designing with Smell: Practices, Techniques and Challenges*, ed. by Victoria Henshaw and others (London: Routledge, 2017), pp. 270–75 (p. 270).

8 Thomas McMullan, ‘“The Missing Sense”: Why Our Technology Addiction Makes Us Crave Smells’, *The Guardian*, 16 September 2016 <<http://www.theguardian.com/technology/2016/sep/16/smell-digital-technology-ophone-cyrano>> [accessed 6 March 2018].

9 David G. Laing, Richard L. Doty, and Winrich Breipohl, *The Human Sense of Smell* (Berlin, Heidelberg: Springer Science & Business Media, 2012), p. 77.

the smellscape might be rendered eye-visible. With goals of enabling improved human olfactory communication and connecting places with smells, this research would be of value to designers who are interested in conceptualising, conveying and representing sensory worlds first encountered from a non-visual perspective.

This thesis reveals the practices involved in exploring, recording and sharing everyday, urban olfactory environments. Guiding this study are ontogenetic understandings of mapping that link theory with practice and regard mapping as emergent.<sup>10</sup> The mapping practices undertaken can be defined as performative, projective and agentic<sup>11</sup> as explored in greater detail in Chapters Three, Four and Five.

## 1.2 *Sensory mapping: designer positionality*

My interest in translation of the sensed aspects of place into visual and tactile form dates from 2010 when I was studying for an MFA in Graphic Design at Edinburgh College of Art. I set about a sensory deconstruction and subsequent re-presentation of the city according to five of the human senses in the form of creative mappings. The exhibited maps were each enhanced by a physical item based on the sense perspective. My goal, to encourage individual action and promote direct experience, was achieved by deliberately deploying mapping styles and techniques that alluded to the highly personal and contestable nature of sensory experience. I subsequently focussed on the olfactory. I now work globally (focussing mainly on Europe and North America), investigating the olfactory qualities of place through the noses of local populations. My research has emerged from explorations of smell undertaken as personal projects or through more

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10 Rob Kitchin and Martin Dodge, 'Rethinking Maps', *Progress in Human Geography*, 31.3 (2007), 331–44; Rob Kitchin, Justin Gleeson, and Martin Dodge, 'Unfolding Mapping Practices: A New Epistemology for Cartography', *Transactions of the Institute of British Geographers*, 38.3 (2013), 480–96.

11 Chris Perkins, 'Performative and Embodied Mapping', *International Encyclopedia of Human Geography*, Oxford: Elsevier, 2009, 126–132; James Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', in *Mappings*, ed. by Denis Cosgrove (Guildford: Reaktion Books Ltd., 1999), pp. 213–52.

applied commissions from a range of clients including city transportation departments, arts festivals, speculative storytellers and anosmia charities.

I am a communication designer and a long-distance runner. Both aspects of my professional life, contribute to this study, one overtly as my discipline, the second evidences my intrinsic value in direct, physical activity as a means of engagement with the world through multi-sensory experience. This communication design research forms part of my PhD studies in Information Experience Design at the Royal College of Art in London. My work straddles Candy's paradigms as both practice-based, that is 'an original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice' and practice-led in that it 'leads to new knowledge that has operational significance for that practice'.<sup>12</sup> As indicated by this thesis' title, *Nose-first: practices of smellwalking and smellscape mapping*, the process of research and the arrangement of content in this thesis all illustrate the extent to which practice and theory are interdependent. The iterative practice over many years ensures that, as Candy and Edmonds argue, 'the making process itself leads to a transformation in the ideas – which in turn lead to new works'.<sup>13</sup>

As a white, middle class, academic, feminist, design practitioner researching representation of the smell perceptions in places unfamiliar to myself I am aware of my privileged knowledge-power status when researching in local communities. To avoid exploitation of my research participants, I always give something in return whether it be a personal interaction with a single smellwalker, or information about smellscape theory and techniques for encountering smells with the group (see Chapters Three, Four and Five) as advocated in qualitative social science research (and as ethically responsible behaviour).<sup>14</sup> My practice deploys the smellwalk, a qualitative method developed in urban studies to understand

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12 Linda Candy, 'Practice Based Research: A Guide', *CCS Report*, 1 (2006), 1–19 (p. 1).

13 Linda Candy and E. A. Edmonds, 'Practice-Based Research in the Creative Arts: Foundations and Futures from the Front Line', *Leonardo*, 51.1 (2018), 63–69 (p. 64).

14 Amir Marvasti, *Qualitative Research in Sociology* (London; Thousand Oaks; New Delhi: SAGE Publications, 2003).



the physical and cognitive experience of being within a particular environment, to collect human-perceived data. The smellwalk frequently elicits a change in participants' knowledge of their neighbourhood, and of their own sense of smell.

### 1.3 *Contribution to knowledge*

My main contribution to knowledge, practical and replicable means by which the smellscape can be rendered visible, is supported by two additional sub-areas. Part of the knowledge is embedded within the composite mappings of individual smellwalker experiences which are disseminated through public exhibition, open access research papers and via my sensory maps website.

The airspace between the source of a smell and the human nose that perceives it is understood to be eye-invisible yet this space contains molecules that humans detect. Through mapping practices explored and tested in Chapters Four and Five, and smell visualisations indicated in Chapter Six I suggest a variety of design approaches that enable an ephemeral, qualitative and invisible smellworld to come into being, through form and shape. These visual encodings are design-specific, removed from the chemical semiotics of molecular diagrams and the odour-wheels used in smell-related industries such as perfumery and wine-making. Application of these symbols to represent olfactory environments – as opposed to isolated smell instances – might enable contemporary and historical smellscales to be recorded, communicated and archived in a form other than words. The practice component of my research has resulted in a replicable series of tools for communication of the smellscape from smell sketching and smell visualisers for individual and personal communication, to smellscape maps, animations and models for dissemination to wider audiences.

The practice is integral to my original contribution to knowledge. Each smellmapping practice piece, included in this thesis and listed in Table 1.1. informs or embodies the rendering visible of the smellscape. For example, *Scentscape 06 • 2015 The City of Singapore* is a digital print in

which I test the application of mapping conventions to depict the complexity of the smellscape. Here the research leads to new understandings about practice thus can be regarded as ‘practice-led’, whereas *Scentscape Singapore II* is a creative artefact which is the basis of contribution to knowledge as a 3D model of an imagined space of smells.<sup>15</sup>

Title of Practice piece	Format	Practice-based [B] or Practice-led [L]	Contribution to Knowledge	Chapter / Figure / Page location in thesis
<i>Scentscape 06 • 2015 The City of Singapore</i>	Digital print	L	Application of mapping conventions of layers and symbols to depict complexity of the smellscape	Ch. 4 Figure 4.16 p. 132
<i>Scentscape Singapore II</i>	Model / sculpture – acrylic, beads and slate	B	Model of an imagined dimensional space of smells	Ch. 4 Figure 4.18 p. 135 Figure 4.19 p. 136
<i>‘odours of the morning and evening’</i>	Digital print	L	Comparative topologies of smell-duration	Ch. 4 Figure 4.26 p. 142
<i>A Winter Smell-walk in Kyiv</i>	Digital print	L	An understanding of the rhythmic relationships between human, movement and smell	Ch. 5 Figure 5.11 p. 160
<i>Taking a Line from its Walk</i>	Digital animation	B	Pulses and concordance and collision within the smellwalk	Ch. 5 Footnote: 311 p. 177
<i>Walking and sniffing in the wind: Smellwalk Rhythms I – VII</i>	Digital animation	L	Individuality of a series of smell experiences	Ch. 5 Footnotes: 315 – 321 pp. 179
<i>Polyrhythmias of the Smellwalk</i>	Digital animation	B	Understanding of the multi-faceted dimensions of collective smell perception	Ch. 5 Footnote: 322 p. 180

**Table 1.1:** The practice, and its place in the original contribution to knowledge

15 Candy and Edmonds.

The first sub-area impacting my original contribution to knowledge is the creation of a tripartite structure for the smellwalk method. This includes a series of non-specialist tools to facilitate obtaining and recording everyday, lived olfactory knowledge. I position selected characteristics of smell as qualitative elements of place-specific perception that contribute to an understanding of the environment. Through this positioning, I explore how smellwalking might extend beyond its functionality as a data-collection method – for odour monitoring and within the social sciences – into a performative mapping and a design practice in its own right.

The second sub-area emanates from the use of design to investigate complexity and diversity of the environmental smellscape that results in it being represented as both spatial and temporal. The combination of creative appropriation of cartographic convention and rhythm analysis enables exploration of a conceptual model for the smellscape that incorporates both space and time. Overall, the research contributes to the development of a nascent field of sensory communication design.

#### *1.4 Navigating the thesis*

The structure of the thesis is closely aligned to my design process, relating the systematic narratives of my research, not always in chronological order but taking an approach to smellscape appreciation which triangulates between sniffing, walking (as a means of encountering smells) and mapping (as a means of recording and communicating smells) so as to promote direct encounters through active sensing. This structure allows me to explore theoretical concepts in tandem with the practice-based case studies. It also serves to contextualise my practice indicating my position and critical reflection.<sup>16</sup> Ultimately the role of this written thesis is to share new understandings that result from a systematic approach to answering the research questions. The thesis is structured as follows:

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16 Candy and Edmonds.

Chapter One, *Introduction*, sets the scene, frames the research, identifies my positionality as the researcher and indicates my original contributions to knowledge.

Chapter Two, *Smells, mappings and smellscapes*, specifies the research context for the work by pointing to how scholars in other disciplines conceive of the smellscape. A brief overview considers how urban smellscapes have altered through time. I reference post-modernist perspectives on mapping situating my own work within performative and agentic traditions, and then analyse a range of historical and contemporary smell maps. A comparative analysis of the epistemologies and aims of those creating the smell maps leads me to identify a gap in knowledge and to indicate my research questions.

Chapter Three, *Practices of apprehension: evolutions of olfactory exploration*, explains the methodological approach to the research. Beginning with an explanation of the active and situated nature of research-through-design, I then draw from design scholars to indicate how such work might be evaluated. I explain why the agency inherent in mapping and rhythmanalysis are relevant tools of analysis of place-specific smell perception and explain how I reached the selection of smells' attributes for qualitative mapping. The remainder of the chapter traces the lineage of the smellwalk as a design practice, explaining how different goals alter the way in which the walk is conducted.

Chapter Four, Case Study 1, Singapore, *Practices of scentscape representation: dimensional spatialities*, connects the collectively-perceived smells of Singapore in 2015 with cartographic languages and symbols, through mapping techniques more commonly used to render seen aspects of the landscape. I explore how classic symbols of map design might represent the aggregated data of two hundred smellwalkers through a spatial mapping. A structure of 'fields, extracts and plottings' is deployed to show how spatial relationships form between place, human and smell in both 2D abstracted form and volumetric modelling.<sup>17</sup> Finally, I describe how

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17 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 231.

qualitative interpreted smell data might form new, temporal, comparative olfactory landscapes.

Chapter Five, Case Study 2, Kyiv, *Practices of smellscape representation: multi-scalar temporalities*, follows a single smellwalk (Kyiv, December 2016) in close detail using text and photography to connect smell with rhythms. The practice and theory interweave as participant smellsketches reveal local multi-scalar temporalities and I explore the comparative rhythms invoked by the structure of the smellwalk. The rhythmic pace of sniffing is reframed as animated smell detections leading to further practice that incorporates spatial elements; geo-located smellwalk routes and the effects of the wind on the ephemeral visual symbols. Finally, I discuss how polyrhythmias of the smellwalk might be observed through the superimposition of individual animation sequences.

Chapter Six, *Findings, insights, limitations and conclusions: eye-visible smellscapes*, summarises the findings of each chapter and connects the two case studies through revelations from the research. I suggest a variety of mapping formats appropriate to explore relationships between smell with space, place, time and people and consider how the work might evolve to combine practices of animation and dimensional design in generating 4D smellscape mappings of smellscapes. I briefly cite challenges and opportunities for future work and conclude with a summary of how a combination of individual imagination and mapping practices lend themselves to the eye-visualisation of olfactory data and the representation of sensed worlds.

Having introduced my research journey and original contribution to knowledge, in Chapter Two I continue with an interdisciplinary examination of the literature and practices from which my specific research questions arise.

## Chapter Two

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# Smells, mappings and smellscapes

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## 2.1 *Smell; chemistry, geography and design*

This chapter reviews the literature and practice of smellscapes and their mappings from an interdisciplinary perspective. Situated within design, itself a hybrid of art and science that is by nature interdisciplinary, my research connects one of the chemical senses – smell – to the projective agency of mapping linking people with their multisensory environment through active sensing.<sup>18</sup> While the Proustian, memory-centred, internalisation of smell tends to dominate creative art and design discourse and practice my research focuses on smell perceptions of ordinary people in everyday environments.<sup>19</sup>

Motivation for my research derives from the theories of J. Douglas Porteous who suggests urban dwellers are increasingly alienated from physical sensory experience.<sup>20</sup> Equally the findings of Charles Foster who detected a flaw in the overdependence of humans on sight, namely their inability to relate to the entirety of their environment, have informed my research.<sup>21</sup> The 'sensory turn' of the nineties challenged psychology's monopoly of the senses addressing relational and dynamic patterns of

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18 Robert Nelson and Writing-PAD (Network), *The Jealousy of Ideas: Research Methods in the Creative Arts* (Fitzroy, Vic.; London: Ellikon ; Writing Pad, 2009).

19 Kristina Rapacki, 'The Smell of Design', *DisegnoDaily*, 2014 <<https://www.disegnodaily.com/article/the-smell-of-design>> [accessed 9 January 2018]; Oliver Wainwright, 'Scentography: The Camera That Records Your Favourite Smells', *The Guardian*, 28 June 2013, section Art and design <<http://www.theguardian.com/artanddesign/architecture-design-blog/2013/jun/28/scentography-camera-records-smells-memory>> [accessed 9 January 2018]; *Sense of Smell*, ed. by Marcel Van Brakel, Wander Eikelboom, and Frederik Duerinck (Breda, The Netherlands: The Eriskay Connection, 2014).

20 Porteous.

21 Charles Foster, *Being a Beast* (London: Profile Books, 2016).

everyday engagement with the world within the humanities, social sciences, neuroscience, art, and design.<sup>22</sup> A specific gap in multisensory research within design was addressed through a 2018 exhibition and accompanying book *The Senses: Design Beyond Vision* in which the dominance of visual design was confronted through works combining multiple senses and reinforced by a call to action for further multisensory design practice for life-enhancing inclusivity.<sup>23</sup> An edited collection of contemporary case studies spanning olfactory art, smell representation, smellscape design and monitoring, retail and service design, smell learning environments, historical and theatrical smellscapes, smell capture and diffusion was published in 2017 to examine how contemporary practitioners use smell in cutting-edge design.<sup>24</sup> My research into smell representation within communication design featured in both publications and informed early stages in my thinking as to how smellscape mapping might be regarded as a processual activity.

This review is organised thematically. I commence by analysing interpretations of the smellscape as understood across a range of arts and humanities disciplines; history, urbanism, architecture, landscape architecture, sensory studies and olfactory art, and then assess types of mapping practices most aligned with my approach. Since the focus of my research has been on refining my practice, an analysis of prior practices which 'map' the smellscape and a critique of their methodological approaches, central concepts and outcomes was undertaken. The interdisciplinary nature of my research draws on knowledge from a range of relevant fields; primarily cultural geography, communication design, and creative cartography to understand what smell representation might contribute to communication design research.

The gap in knowledge as to how qualitative smell perceptions might be recorded and communicated are seen as a part of a trajectory

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22 Howes.

23 Cooper Hewitt Smithsonian Design Museum; Lupton and Lipps.

24 Henshaw, Medway, McLean, and others.



within design that is coming to appreciate the value of a relational approach within a discipline that has long-regarded itself as primarily visual.

## 2.2 *Out there: definitions of the smellscape*

The word 'smellscape' has its roots in cultural geography (first used by Gade in 1984) and later theorised by Porteous whose seminal paper also indicated the challenges inherent in studying and recording sensuous olfactory worlds. Porteous' conception of the smellscape is as the totality of the olfactory landscape in a specific place; including both background and episodic smells (his term for temporary or site-specific aromas). His contention is that, unlike an ordered visual landscape, the smellscape is an emotive environment that is 'non-continuous, fragmentary in space and episodic in time'.<sup>25</sup> He indicates how smells can be understood as place-specific; 'located with reference to source, air currents, and direction and distance from source', and enrich the overall character of a place.<sup>26</sup>

Sensory geographer, Paul Rodaway, draws attention to the smellscape's temporal transience, as 'smells infiltrate or linger, appear or fade'.<sup>27</sup> He discusses how research into solicited and unsolicited apprehended smell across time and space is constrained by limited Western vocabularies, which suggests to me a role for design to represent the smellscape in alternative communicable forms. Rodaway struggles to provide arguments for a more scientific approach to olfactory geography as he casts smell as unclassifiable; 'smells are not neatly defined objects in the sense of visual objects but experiences of intensities, more like those of pain and joy'.<sup>28</sup> He continues to note how everyday smells are notable by their absence from smell classification systems. Where Porteous focuses on human-smell experience, Rodaway calls attention to smell-environment

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25 Porteous, p. 25.

26 Porteous, p. 26.

27 Paul Rodaway, *Sensuous Geographies: Body, Sense and Places* (London; New York: Routledge, 1994), p. 64.

28 Rodaway, p. 65.

communication and relationships. I suggest a triangulation of the key elements may serve research into mapping the smellscape. He continues to note the importance of interaction to olfactory experience in which smell is 'a kind of communication with the environment'.<sup>29</sup> For Rodaway a combination of the ephemeral nature of the smellscape, its lack of permanent features, its intimacy with individuals through direct and proximal encounter, and smells' propensity to dissipate means that, 'To discern a "map" or smellscape [...] is probably both impossible and unnecessary'.<sup>30</sup>

Sensory scholar, Constance Classen, provides a global perspective indicating how different cultures conceptualise the smellscape in line with geographical and meteorological specificities of their environment and world understanding; the Andaman Islanders regard the smellscape as a living entity, one that aligns with an understanding of space as fluid and dynamic, an environmental flow whereas a Senegalese conceptualization of the smellscape is as a series of olfactory zones, crossed by a collection of scent trails or 'wind threads'.<sup>31</sup>

Similarly informative, in his examination of smell in pre-modern India, cultural historian James McHugh contrasts Western ideas of smells as invisible and intangible with a holistic understanding of smell as object-based. Within Hindu communities odour took primary position in the order of the senses; its ranking predicated on smells' emanation from earth (as the possessor of all sensory qualities). Smell is taken to be ingested particulate matter; odour atoms that are carried by the wind, which is itself tangible. Odourants are described by comparison to others; they differ in intensity and diffusiveness, and they travel great distances.<sup>32</sup>

In combining the ecological and individual, the rural and the urban, the fixed and the fluid my overview of the smellscape places it as subjective,

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29 Rodaway, p. 68.

30 Rodaway, p. 69.

31 Constance Classen, David Howes, and Anthony Synnott, *Aroma: The Cultural History of Smell* (London: Routledge, 1994), p. 99.

32 James McHugh, *Sandalwood and Carrion: Smell in Indian Religion and Culture* (New York: Oxford University Press, 2012).

active, mobile, fleeting and multi-dimensional. This appreciation of a variety of conceptual approaches thus informs how I come to terms with how the smellscape might be experienced. But the physical nature of smell equally informs my practice; a smell, when sniffed, registers as tangible and so might be understood to possess sensorial translatable characteristics of its own. I embrace smell as possessing a physical and tangible presence, within air as its carrier, from its source to its perception which leads me to consider how smell-place, smell-human and smell-time relationships have been theorised.

That smells are place-related is commonly agreed across a range of literature from the arts and architecture through sensory and cultural studies to bio-anthropology.<sup>33</sup> Lefebvre argues how the production of space and smell are bound together; 'where an intimacy occurs between "subject" and "object", it must surely be the world of smell, and the places they reside'.<sup>34</sup> It can be argued that olfaction enables direct encounters with the environment in ways that sight cannot, creating an unmediated sense of place. An immediacy of encounter is one notable characteristic of smell.

In response to an identified lack of consistency in the call for multimodal understandings of place, sensory art historian and olfactory art curator, Drobnick, suggests the need for a coherent methodology and field of inquiry, '*toposmia* (place + smell), which describes the spatial location of odours and their relation to particular notions of place'.<sup>35</sup> He suggests that whilst a landscape can be framed and viewed at a distance, a smellscape

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33 Diane Ackerman, *A Natural History of the Senses* (New York: Random House, 1990); Classen, Howes, and Synnott; *Senses and the City: An Interdisciplinary Approach to Urban Sense-scapes*, ed. by Madalina Diaconu and others (Wien: Lit Verlag, 2011); Victoria Henshaw, *Urban Smellscapes: Understanding and Designing City Smell Environments* (New York: Routledge, 2014); Kara C. Hoover, 'The Geography of Smell', *Cartographica: The International Journal for Geographic Information and Geovisualization*, 44.4 (2009), 237–39; Joy Monice Malnar and Frank Vodvarka, *Sensory Design*, (Minneapolis: University of Minnesota Press, 2004); Eleanor Margioles, 'Vagueness Gridlocked', *Performance Research: A Journal of the Performing Arts*, 6.2 (2001), 88–97; Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977).

34 Henri Lefebvre, *The Production of Space*, trans. by Donald Nicholson-Smith (Malden, MA: Wiley-Blackwell, 1991), p. 196.

35 Jim Drobnick, 'Toposmia: Art, Scent, and Interrogations of Spatiality', *Angelaki*, 7.1 (2002), 31–48 (p. 33).

is necessarily immersive due to the inhalation process by which smells are sensed, before arguing how the possibility of wind-driven smell renders it at once a distant yet localised sense. His list of smellscape variables, from the meteorological through the temporal to the scalar, serves to outline the complexity of an environmental smellscape.<sup>36</sup> His positional paper problematises approaches and understandings of the smellscape considering nationalist ideologies, othering, nostalgia and politics, and the essentialising of smell with place and space indicating that such concerns are an impetus to further study that might be approached through art practice. However, his discussion of the possibilities of mapping is limited to how the affective qualities of smell relate to Debordian psychogeographic approaches, which I discuss with reference to the Kyiv smellwalks in Chapter Five.<sup>37</sup>

Olfactory urban design and planning practices focus on how populations experience smell and concomitant debates of masking, pollution and environmental control. Henshaw defines the smellscape as 'the overall smell environment, but with the acknowledgement that as human beings, we are only capable of detecting this partially at any one moment in time, although we may carry a mental image or memory of the smellscape in its totality'.<sup>38</sup> Thus, it is the purview of the individual experienced over time. Henshaw suggests how urban smellscape can be conceived through appreciation of a hierarchy of odour longevity, comparable with the perfumery pyramid model (Figure 2.1), lending them a structure.<sup>39</sup> When it comes to understanding how these might be directly correlated to place, Henshaw suggests there is a gap in the visual representation of olfactory environments.<sup>40</sup>

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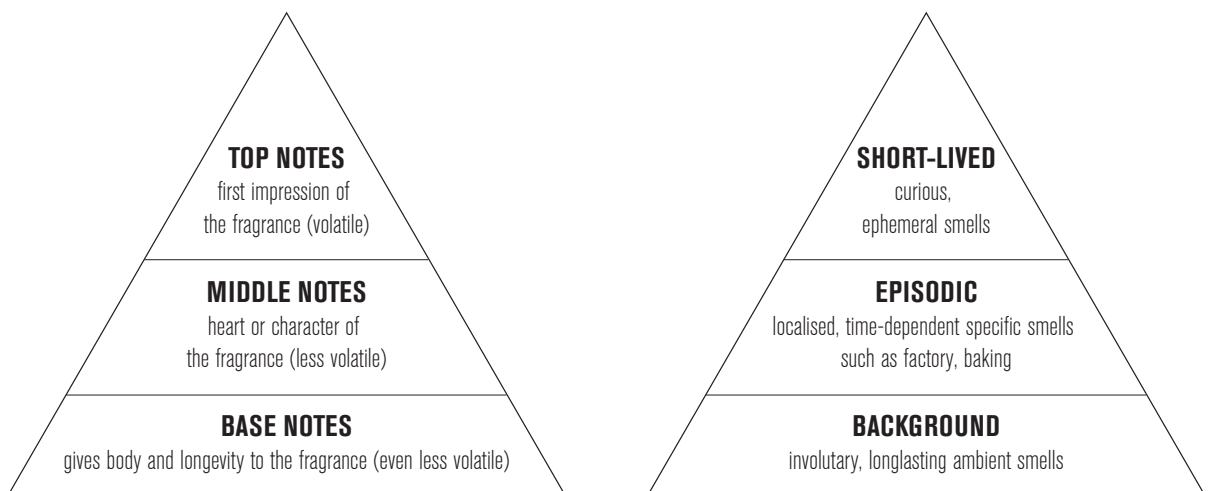
36 Drobnick, 'Toposmia'.

37 Guy Debord, 'Theory of the Derive', trans. by Ken Knabb (Situationist International online) <<https://www.cddc.vt.edu/sionline/si/theory.html>> [accessed 14 August 2018].

38 Henshaw, *Urban Smellscapes*, p. 5.

39 Henshaw, *Urban Smellscapes*.

40 Henshaw, *Urban Smellscapes*.



**Figure 2.1:** Comparison of the composition of a perfume with that of an urban smellscape

In theorising how cybertography, as a transdisciplinary, multi-sensory, multimodal digital approach to mapping might lead to scented cartography, Lariault and Lindgaard point out ‘that map users and creators must check their olfactory biases at the door’<sup>41</sup> so as to better represent the smell perceptions of local populations – a concern rarely mentioned in other literature important in the argument for participatory engagement when smellscape mapping.

Within architecture, Malnar and Vodvarka draw attention to the inter-relationship between the senses positing an anti-Cartesian model in their development of sensory-oriented spatial design reinforcing how people experience space on a multi-sensory level.<sup>42</sup> Barbara and Perliss highlight how the temporal and evanescent qualities of scent might be appropriated to imbue architecture, and therefore place, with greater meaning.<sup>43</sup> Diaconu calls attention to the privileged experience of urban space afforded by olfaction and notes a collective political responsibility for shaping our environment, arguing for the use of mapping practices

41 Tracey P. Lariault and Gitte Lindgaard, ‘Scented Cybercartography: Exploring Possibilities’, *Cartographica: The International Journal for Geographic Information and Geovisualization*, 41.1 (2006), 73–92 (p. 88).

42 Malnar and Vodvarka.

43 Anna Barbara and Anthony Perliss, *Invisible Architecture: Experiencing Places through the Sense of Smell* (Milano: Skira Editore, 2006).

to 'sensitise urbanites for the non-visual qualities of the public space'.<sup>44</sup> Contemporary spatial practices advocate a relational understanding in favour of sensory separation.

As smell intensities in cities have altered over time so have prevailing cultural attitudes and, warnings about olfactory cloning resulting in olfactory landscapes.<sup>45</sup> Despite Henshaw's warning, I suggest that contemporary cities are abundant sources of smell experiences that derive from everyday activities and people, the natural and man-made environments.<sup>46</sup> Smells might be fleeting but they also act as markers of seasonal and diurnal temporality forming repeated evanescent components in the sensory landscape. Accounts of the city's olfactory contents, zones and affect can be gleaned from historical texts however, there are fewer historical smell maps of cities to afford spatial understanding and insight.<sup>47</sup> Research through mapping practices has the potential to open our collective noses to an ephemeral, morphing smellscape and also to record the contents of urban olfactory airspace over time, creating an olfactory version of Flickr.<sup>48</sup>

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- 44 Madalina Diaconu, 'Mapping Urban Smellscapes', in *Senses and the City: An Interdisciplinary Approach to Urban Smellscapes*, ed. by Madalina Diaconu and others (Wien: LIT Verlag, 2011), pp. 223–38 (p. 223).
- 45 Oliver Wainwright, 'The Woman Kicking up a Stink about Urban Life: "Cities Are Losing Their Smell"', *The Guardian*, 1 April 2014, section Cities <[http://www.theguardian.com/cities/2014/apr/01/urban-smell-walk-london-city-deodorisation?CMP=tw\\_t\\_gu](http://www.theguardian.com/cities/2014/apr/01/urban-smell-walk-london-city-deodorisation?CMP=tw_t_gu)> [accessed 1 April 2014].
- 46 Henshaw, *Urban Smellscapes*.
- 47 Examples of historical texts without olfactory maps include; D.S. Barnes, 'Confronting Sensory Crisis in the Great Stinks of London and Paris', in *Filth Dirt Disgust and Modern Life*, ed. by William A. Cohen, Ryan Johnson, and David S. Barnes (University of Minnesota Press, 2005), pp. 103–29; Stephen Halliday, *The Great Stink of London: Sir Joseph Bazalgette and the Cleansing of the Victorian Metropolis*, New edition (Stroud: The History Press, 2001); Ivan Illich, 'The Dirt of Cities, the Aura of Cities, the Smell of the Dead, Utopia of an Odorless City', in *The City Cultures Reader 2ed*, ed. by Iain Borden, 2 edition (London ; New York: Routledge, 2003), pp. 355–60; Michael Meighan, *Glasgow Smells* (Stroud: The History Press, 2007); Jonathan Reinartz, *Past Scents: Historical Perspectives on Smell*, (University of Illinois Press, 2014).
- 48 'Flickr', *Flickr - Photo Sharing!*, 2014 <<https://www.flickr.com/photos/davefearon/15118079089/>> [accessed 26 June 2018]; 'Flickr', *Wikipedia*, 2018 <<https://en.wikipedia.org/w/index.php?title=Flickr&oldid=847336252>> [accessed 26 June 2018].

To summarise, smellscape is a term used to describe the odour landscape that surrounds us. Generally, it is agreed that it is a spatial construct that appears to a single person at a moment in time. Depending on the field of research it may be embodied, experiential, ingested and immersive, or objectified and seen as a means by which we enrich our understanding of our world. Smells may come from natural sources, be generated by activity and include the smells of humanity and materiality. Although odour detection is airborne, smells are also embedded in surfaces and within the materiality of urban structures and fabrications as well as the natural world. Despite this focus on the spatial, the smellscape also equally possesses historical, ephemeral and dynamic temporal qualities, which vary according to seasonal urban activity fluctuations and as volatile molecules dissipate.

There is a role for design practice to draw attention to the range of transient and ephemeral smells encountered in everyday environments, collectively registered by individuals and combining them into forms that indicate greater-than-individual experience and more-than-single moment. While the landscape of olfaction is covered across the humanities and social sciences, it is less explored within communication design.

Having broadly defined disciplinary understandings of the smellscape I now turn to mapping perspectives that align with a collective and participatory approach to apprehending the smellscape.

### *2.3 Sifting through the 'scapes: perspectives on mapping*

If maps, as Harley suggests, are 'graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world', then their potential as social constructions is to make space visible, including the space of eye-invisible smells.<sup>49</sup> Wurman suggests such spatial graphic visualisation also affords inter-human

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49 John Brian Harley, in *The History of Cartography Volume One: Cartography in Prehistoric, Ancient and Medieval Europe and the Mediterranean*, ed. by John Brian Harley and David Woodward (Chicago and London: University of Chicago Press, 1987), p. xiv.

communication, although as Dodge argues mapping and geovisualisation in a contemporary ocular-centric culture privileges the visual sense as a way of knowing the world.<sup>50</sup> Lima suggests that while maps are often regarded as means to depict abstract concepts and imaginary places their roots lie in the representation of physical features of the natural world.<sup>51</sup> In this research I deliberately appropriate mapping's visual capacities to present the world through a series of communicable shapes to raise awareness of another sense. Visual mapping, in my understanding, has the potential to remediate the individually-understood collectively, affording multiple simultaneous perspectives of eye-invisible olfactory space.

The foundational ontology of Western scientific cartography, 'that the world can be objectively and truthfully mapped using scientific techniques that capture and display spatial information' is problematic when it comes to smell since, as Margolies argues, the panoptic view of the map may appear to contradict the lived experience of olfaction.<sup>52</sup> The dichotomy of cartography as an aerial-view reductive scientific practice versus mapping as an artistic practice, also referred to as the difference between 'grid maps' and 'story maps', has been researched significantly thereby setting precedence for mapping non-visual sensory data.<sup>53</sup>

In tracing post-modern cartographic strategies Mitchell asserts how the map mirrored epistemological shifts away from the privileging of the mind. One field of inquiry, concerning itself with the urban question

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50 Martin Dodge, 'Mapping and Geovisualisation', in *Approaches to Human Geography*, ed. by Stuart Aitken and Gill Valentine, 2 edition (Los Angeles: Sage Publications Ltd, 2014), pp. 289–309 (p. 289); Richard Saul Wurman, *Information Anxiety* (New York: Doubleday, 1989), p. 260.

51 Manuel Lima, *Visual Complexity: Mapping Patterns of Information* (New York: Princeton Architectural Press, 2011), p. 80.

52 Kitchin, Gleeson, and Dodge, p. 480; Margolies, p. 91.

53 William Cartwright, Sébastien Caquard, and Laurene Vaughan, 'Mapping from Above/Mapping from the Ground: Mapping Environmental Issues in the City', in *Mapping Environmental Issues in the City*, ed. by Sébastien Caquard, Laurene Vaughan, and William Cartwright, Lecture Notes in Geoinformation and Cartography (Berlin, Heidelberg: Springer, 2011); S. Caquard, 'Cartography I: Mapping Narrative Cartography', *Progress in Human Geography*, 37.1 (2013), 135–44; Katharine A Harmon and Clemans, Gayle, *The Map as Art: Contemporary Artists Explore Cartography* (New York: Princeton Architectural Press, 2009).



and cognitive mapping, transitioned from global to local perspectives in acknowledgement of the impossibility of the totalising map within a culture of decentralisation. The concrete, prescriptive view was increasingly replaced with a more abstract and active approach:

The subject [...] becomes cartographer at street level, plotting trajectories in a mapping process that is always about an experience of the world, rather than delineating an all-encompassing map in order to define the totalizing knowledge of the world.<sup>54</sup>

It is this mutable, decentralised city as the subject for endless, individual re-mappings – a social activity creating a cultural text that enables participants to, as Harley suggests, ‘embrace a number of different interpretative possibilities’<sup>55</sup> – that intrigues me.

Through a performative understanding of mapping as a practice, as opposed to material or cognitive, the map can be understood as ontogenetic. And as such, the map has the potential to bring spatial and temporal realities into being by embracing map creation and the map reader over the map producer. Whether performative mapping results in a material artefact, narrative or an experience, Perkins suggests the approach may serve to unite practice and theory and in so doing bring ‘the academic world closer to those of the creative artist and activist. It shows how mapping can be at once social and empowering’.<sup>56</sup> As mentioned earlier, my research explores how social, performative mapping might contribute to communication of non-visual, sensory olfactory information.

Moving on from the epistemological shift initiated by Harley, theorised mapping practices range from critical and affective to cognitive and social. At the political and critical end of the scale, counter-mapping regards the map as potential producer of reality with an explicitly political agenda and map creation often depends on the ‘participatory’ tools of a

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54 Peta Mitchell, *Cartographic Strategies of Postmodernity: The Figure of the Map in Contemporary Theory and Fiction* (New York: Routledge, 2007), p. 22.

55 John Brian Harley, ‘Deconstructing the Map’, *Cartographica: The International Journal for Geographic Information and Geovisualization*, 26.2 (1989), 1–20 (p. 247).

56 Perkins, p. 132.

community.<sup>57</sup> Whereas mapping, as a subversive artistic activity, exploits the selectivity of subject matter in combination with a particular place as a starting point for political or social critique.<sup>58</sup> Historical and contemporary practitioners use maps to 'make a political case that challenges the authority, embedded value system, and perceived utility of the map by displacing our attention to things that are definitively small, quotidian and personal'.<sup>59</sup> While smell in the city is inherently political, I am limiting my research to a qualitative and imaginative representation of smells' perceived qualities.

Affective cartography adopts many creative forms ranging from performance and installation to web-based projects which work in one of two ways; either by bringing emotion to the map through individual contributions or by eliciting emotion through performative cartographic storytelling.<sup>60</sup> Affective cartography challenges quantified representation of datasets that are difficult to conceptualise such as sound levels, and as such could similarly be used to frame human perception of urban smells. Affective mapping of urban smellscape might draw heavily on Vaughan's argument that maps and atlases possess the ability to transport us to a different land through visual means, balancing control and spontaneity.<sup>61</sup>

In the creative realm the map is far more than simply an artefact; it is processual, possessing inherent agency, with creative potential to

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57 Nancy Lee Peluso, 'Whose Woods Are These? Counter-Mapping Forest Territories in Kalimantan, Indonesia', *Antipode*, 27.4 (1995), 383–406.

58 Maggies Gray, *The Art of Mapping, Exhibition Catalogue* (London, UK: TAG Fine Arts, 2011); Harmon; kanarinka, 'Art-Machines, Body-Ovens and Map-Recipes: Entries for a Psychogeographic Dictionary', *Cartographic Perspectives*, 2006, 24–41; Denis Wood, John Fels, and John Krygier, *Rethinking the Power of Maps* (New York: Guilford Press, 2010).

59 Catherine D'Ignazio, 'Art and Cartography', in *International Encyclopedia of Human Geography*, ed. by Rob. Kitchin and Nigel J. Thrift (Amsterdam [u.a.]: Elsevier Science, 2009), p. 198.

60 Teresa Iturrioz and Monica Wachowicz, 'An Artistic Perspective for Affective Cartography', in *Mapping Different Geographies*, ed. by Karel Kriz, William Cartwright, and Lorenz Hurni, Lecture Notes in Geoinformation and Cartography (Berlin, Germany: Springer, 2010).

61 Laurene Vaughan, 'Mapping the Imagined', in *Mapping Different Geographies*, ed. by Karel Kriz, William Cartwright, and Lorenz Hurni, Lecture Notes in Geoinformation and Cartography (Berlin, Heidelberg: Springer, 2010), pp. 93–102 (p. 95).

'uncover realities previously unseen or imagined, even across seemingly exhausted grounds'.<sup>62</sup> Through his own practice James Corner makes a persuasive argument for the creative power of mapping in a complex world:

The unfolding agency of mapping may allow designers and planners not only to see certain possibilities in the complexity and contradiction of what already exists but also to *actualise* that potential. [...] To create *anything* outside the normative.<sup>63</sup>

In representing commonly overlooked spaces of rural America viewed from the air, Corner's map-landscapes 'become both the subject and object of representation' uniting practice and theory, body and mind serving as an inspiration for my smellscape mappings.<sup>64</sup>

Hypothetical guidance for the creation of digitised smellmaps suggests, 'Geography is odoured. Scent as a theme is making its way into cartography, but there are only a few scented maps'.<sup>65</sup> While Lauriault and Lindgaard's argument that olfactory inclusion in cartography could facilitate engagement with spatial information is more concerned with the broad educational agenda of cybercartography, they pose a comprehensive series of questions as to how technologies might be used to approach the recording and dissemination of smells in both the 'real' and 'virtual' worlds.

Temporality, or 'time insofar as it manifests itself in human existence',<sup>66</sup> is intimately bound with digital mapping. It brings into play new 'interactive affordances [...] allowing us to track our current and past locations as well as calling the future into being by advising on potential routes and ways forward'.<sup>67</sup> Olfactory phenomena are deeply temporal; their ephemeral nature means they will, in all probability, disappear from the map.

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62 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 213.

63 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 214.

64 Nadia Amoroso, *The Exposed City: Mapping the Urban Invisibles* (New York: Routledge, 2010), p. 105.

65 Lauriault and Lindgaard, p. 83.

66 David Couzens Hoy, *The Time of Our Lives: A Critical History of Temporality* (Cambridge, MA: MIT Press, 2012), p. xiii.

67 Alex Gekker and others, 'Introduction: Mapping Times', in *Time for Mapping: Cartographic Temporalities*, ed. by Sybille Lammes and others (Manchester: Manchester University Press, 2018), p. 2.

In privileging time over space, temporal approaches to mapping foreground the processual, such as human encounters with smells. Thus, mapping of smellscapes can be understood as both a spatial and temporal activity.

My mapping practices draw from a hybrid of agentic, performative and temporal perspectives.<sup>68</sup> My work does not have the overt political agenda of counter-mapping, nor does it explicitly seek to be affective, or attempt to replicate smells. That pragmatic communication of the spatiality of smell has henceforth been under-theorised indicates potential for creative communication.

Many contemporary approaches to recording and mapping the smellscape come from scientific methods, seeking to monitor and quantify odours.<sup>69</sup> Although my study is set in design, where messiness and complexity are celebrated and qualitative information is equally valid as worthy of visual interpretation, I move on to analyse both historical and contemporary practice-based mappings including both quantitative and qualitative representations of the smellscape so as to gain an overview of datasets, aesthetics and output formats.

## 2.4 *Mapping urban smellscapes: words, images and scents*

Mapping urban smellscapes takes two main forms; visual maps and olfactory installations. This section considers the practices of an evolving field and examines the context, motivation, output and outcomes for practices most directly related to this study. The first recorded smellmap is attributed to Jean-Noël Hallé whose 1790 *River Seine in Paris* is one of the

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68 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'; Perkins; *Time for Mapping: Cartographic Temporalities*, ed. by Sybille Lammes, Chris Perkins, Alex Gekker, and others (Manchester: Manchester University Press, 2018).

69 John Jiang, Patrick Coffey, and Brendan Toohey, 'Improvement of Odor Intensity Measurement Using Dynamic Olfactometry', *Journal of the Air & Waste Management Association*, 56.5 (2006), 675–83; Charles M. McGinley, Michael A. McGinley, and Donna L. McGinley, 'Odor Basics, Understanding and Using Odor Testing', 2000; Charles M. McGinley and Michael A. McGinley, 'Odor Intensity Scales for Enforcement, Monitoring, and Testing', in *Proceedings of the Air & Waste Management Association's, 93rd Annual Conference & Exhibition* (presented at the Air and Waste Management Association, 2000 Annual Conference Salt Lake City, Utah, Pittsburgh, PA: A & WMA, 2000).

first recorded smellwalks that takes the form of a written narrative depicting odours.<sup>70</sup> Hallé's active mapping references smell voids – whole sections of the river where no smells exist – and highlights the sequential nature of smell experienced during the course of a walk. Noting smells, and their absences is fundamental in understanding, and explaining the smellscape and, as Corbin explains, a detailed inventory attests to the local range of smell experiences.<sup>71</sup>

Visual maps of smell can be divided into three broad themes: historical smells, smellmapping as a research method, and crowd-sourced mashups depicting smell locations. The format of output ranges from illustration to digital geo-tagged maps.

#### *i Maps depicting historical smells*

Mary Dobson's map of Victorian south-east England visually summarises a 'rich vocabulary of odors and their disease patterns' separating the 'bad airs and noxious smells' associated with low-lying marshlands from the 'smoky airs and foul smells' of industrialised urban environments.<sup>72</sup> Dobson's use of line to divide the region into icon-indicated zones to segregate the healthy/unhealthy and natural/human environments imposes an inevitability onto smellscapes of that period.<sup>73</sup>

Visualisation of smell is most commonly associated with odour monitoring as seen in the Manhattan Board of Health map of odour-producing industries of 1870 (Figure 2.2).

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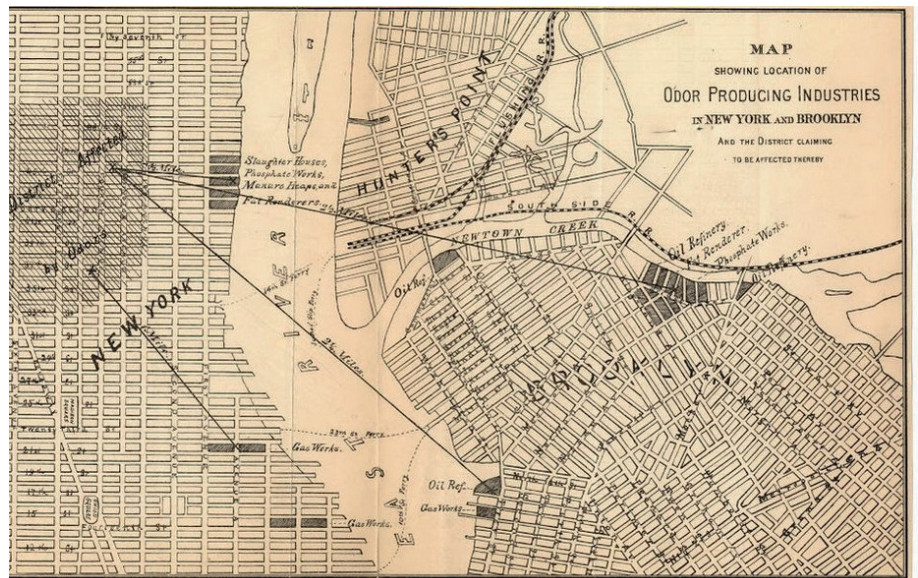
70 Jean-Noël Hallé, 'Procès-verbal de la visite faite le long des deux rives de la rivière Seine, depuis le pont-Neuf jusqu'à la Rappée et la Garre, le 14 février 1790', in *Histoire et Mémoires de la Société Royale de Médecine* (Paris: l'Ecole de santé de Paris, 1789), x.

71 Alain Corbin, *The Foul and the Fragrant: Odour and the Social Imagination* (London: Papermac, 1996).

72 Reinartz, p. 184.

73 Mary J. Dobson, *Contours of Death and Disease in Early Modern England*, Revised ed. edition (Cambridge: Cambridge University Press, 2010).

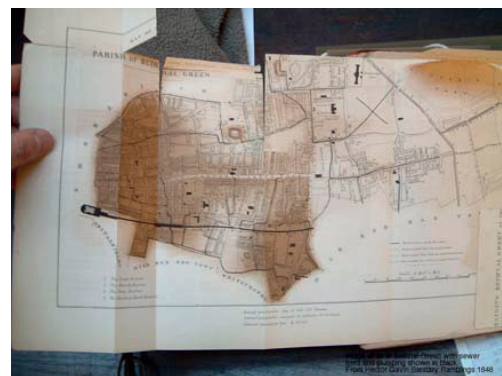
**Figure 2.2:** Map Showing Odor Producing Industries in New York and Brooklyn and the Districts Claiming to be Affected Thereby (1870). Manhattan Board of Health



Olfactory cartographies were popular in Victorian London and Second Empire Paris documenting smells as sources of evil and pestilence, and markers of poverty. Gissen describes Gavin's 1847 *Pestilent Disease Mist of Bethnal Green* (Figure 2.3) as 'an incredible work of documentation, individual curiosity, and olfactory paranoia'.<sup>74</sup>

The hand-drawn map (Figure 2.3) indicates streets and buildings in ink, superimposing a large reddish brown stain indicating both the

**Figure 2.3:** The Disease Mist Overhanging Bethnal Green in the Year 1847. Hector Gavin



omnipresence of odour and alluding to its varying concentration through variable transparency of colour. Such visualisation enables us to appreciate the reach of unconfined smells. Alternatively, Matthew Frank's geo-location of reported smells from a 1910 New York metropolitan sewerage report inspection (Figure 2.4) indicates localised smell source points using Google

<sup>74</sup> David Gissen, 'Olfactory Cartography', *HTC Experiments*, 2009 <<http://htcexperiments.org/2009/08/30/olfactory-cartography/>> [accessed 26 March 2014].

map pushpins.<sup>75</sup> Such deployment of pushpins might be regarded as a distancing mechanism from the smell in the labelling of an historical, subterranean smellscape.



**Figure 2.4:** Manhattan Sewer Smells in 1910 (2013). Image courtesy of Matthew Frank

As forerunners to contemporary online maps created by environmental emission-detection agencies, odour monitoring maps cite source locations and detection zones of odours.<sup>76</sup> The maps focus on odour nuisance and use specialist monitoring technologies in the quantitative detection of unpleasant and noxious smells.<sup>77</sup>

### ii *Smellmapping as a research method*

Diaconu approached mapping of the urban smellscape in *Haptic and Olfactory Design: Resources of Vienna's Creative Industries* research project between 2007 and 2010.<sup>78</sup> Advising research participants to adopt two mapping approaches – mental mapping and monitoring mapping – they created a cognitive, memory map of odours and an experience map following a series of olfactory walks in the city during which they noted

<sup>75</sup> Sadly this work is no longer online.

<sup>76</sup> ERG, 'Odour Dispersion, Odour Mapping, Front End Design, Consultancy', *ERG Air Pollution Control*, 2014 <<http://www.ergapc.co.uk/consultancy.htm>> [accessed 11 December 2014]; St. Croix Sensory, 'ODOR TRACK'R® | St. Croix Sensory', *Five Senses* <<http://www.fivesenses.com/odor-trackr.html>> [accessed 11 December 2016].

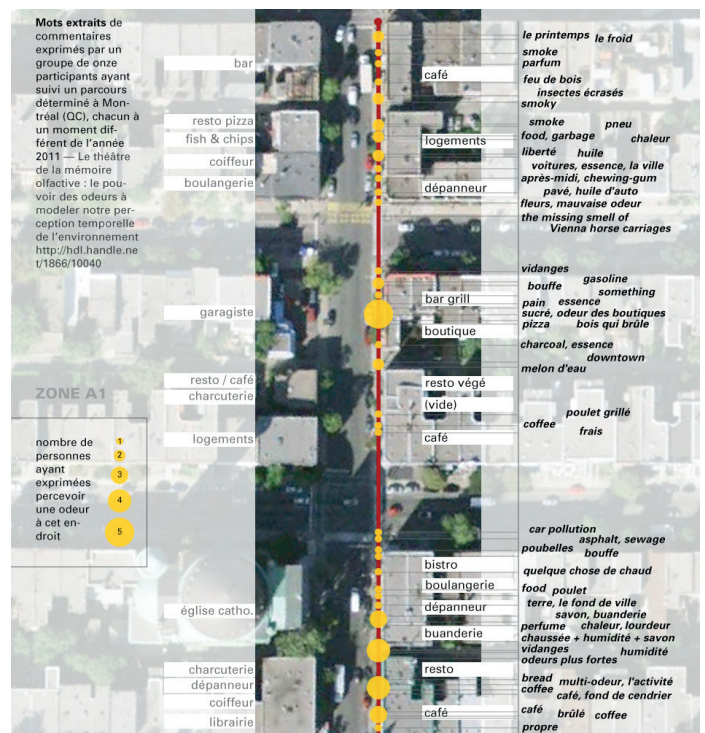
<sup>77</sup> Digital Earth Lab, 'OdourCollect | Digital Earth', 2016 <<http://digitalearthlab.jrc.ec.europa.eu/app/odourcollect>> [accessed 28 December 2016].

<sup>78</sup> University of Vienna, 'Tast- Und Duftdesign | Haptic and Olfactory Design', 2010 <<http://www.univie.ac.at/tastduftwien/>> [accessed 14 January 2018].

weather conditions.<sup>79</sup> The research highlighted a contradiction within their phenomenological perspective in that sensory modalities constitute their own worlds, which may not be wholly replaced by another. The problematic of transcribing the smellscape across sensory modalities is something my own research seeks to address. Diaconu's practices were assessed through three spatial frames: maps (totalising, objective views of the world of visual data), sensescapes (an inhabitant's perspective within a dynamic and shifting environment) and atmospheres (a pervading mood of a place requiring physical presence). The research concluded that 'specific flows of odours cannot be represented according to the principles of physical-metrical space, they have no sides, no parts and no perspective' and that to map the smellscape therefore is paradoxical as such a practice 'attempts to objectify, to visualise, to order and to stabilise smells'.<sup>80</sup>

Urbanist Bouchard layered text annotations onto Google Earth maps (Figure 2.5) to display the collective memory of smellwalkers for her Masters' Thesis *Theatre of Olfactory Memory* which explored the relationship that 'exists between the olfactory atmospheres and the temporal landscape that they shape in the environment'.<sup>81</sup> Text overlay displays smellwalker comments

**Figure 2.5:** Places most likely to bring up temporal landscapes for zone A1 in Montreal, Canada (2013). Image courtesy of Natalie Bouchard



79 Diaconu, pp. 225–26.

80 Diaconu, p. 229.

81 Natalie Bouchard, 'Le théâtre de la mémoire olfactive : le pouvoir des odeurs à modeler notre perception spatiotemporelle de l'environnement' (unpublished Masters Thesis, Université de Montréal, 2013), p. ii.





Graphic design student Esther Wu used mapping as a tool to explore the effects of weather conditions on her own olfactory detection of Dunkin Donuts over an eleven-day period (Figure 2.7). The resulting infographic uses visualization to detect if there was any pattern but as she notes, 'Alas, the study was inconclusive'.<sup>83</sup> Her fragmented visualisation exemplifies a design method for communicating meteorological, olfactory temporalities; the role of wind and temperature in the human-perceived smellscape through repetition of a basemap with a changing superimposed layer for each day.

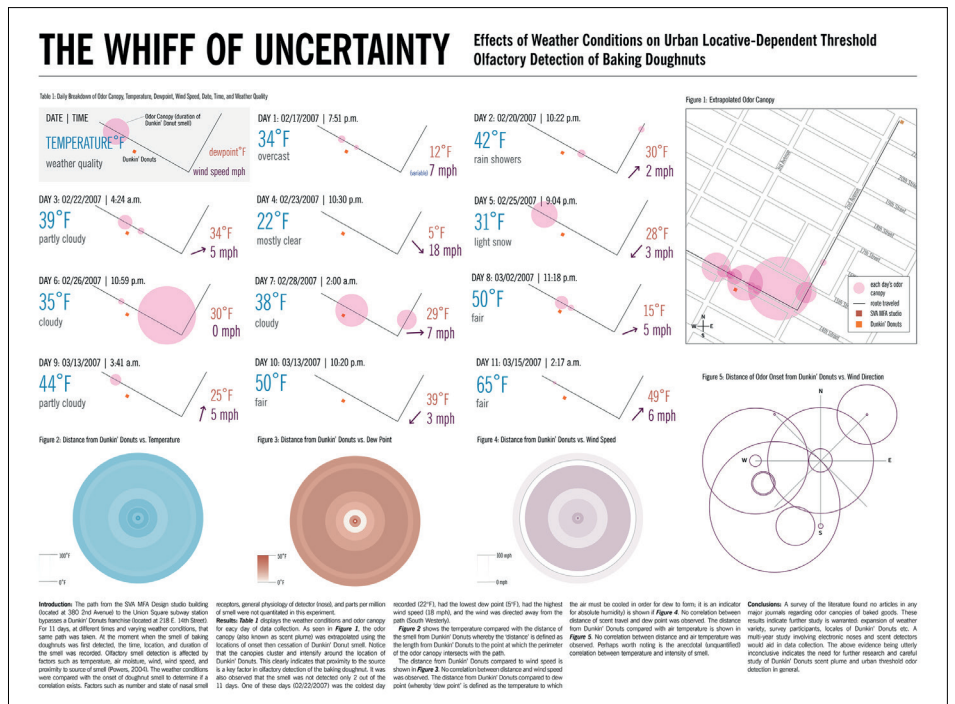


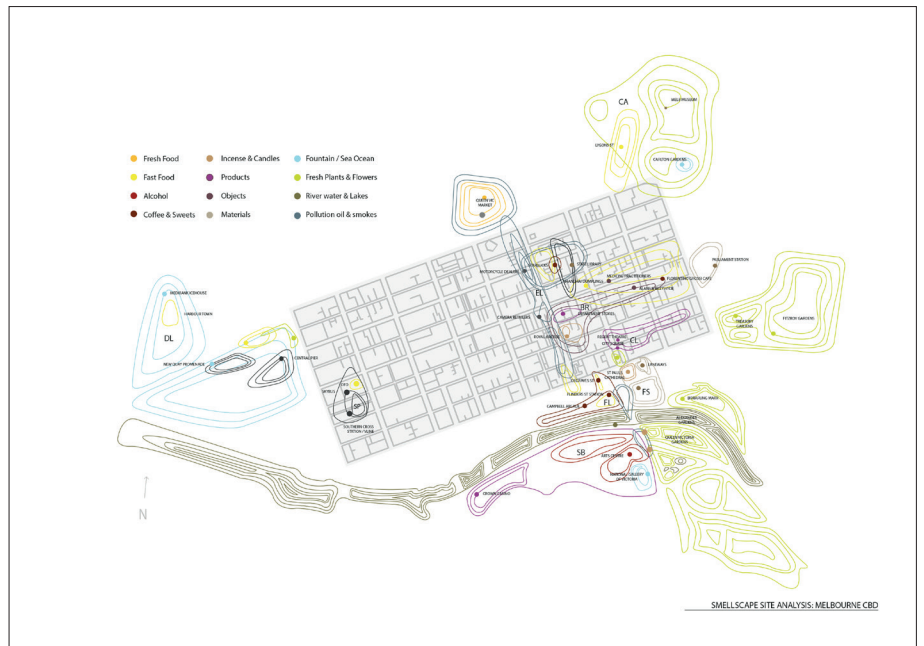
Figure 2.7: The Whiff of Uncertainty (2007). Image courtesy of Esther Wu

Vi Nguyen's undergraduate student interior architecture project, *Discursive Space*, created a 'scent performance' of Melbourne. She used coloured contour lines on a plan view map (Figure 2.8) as a research tool detecting base, middle and top notes, which she subsequently creates as physical scents for use in subsequent proposed performances.<sup>84</sup> A key feature of this map is its overlapping smell detections highlighting the possibility of hybrid smell detection.

83 'Esther Wu Is a Graphic Designer.' <<http://estherwu.com/student.html>> [accessed 29 December 2013].

84 Vi Nguyen, 'Inscents', *Inveesible*, 2013 <<https://inveesible.com/2013/09/02/inscents/>> [accessed 28 December 2016].

**Figure 2.8:** Smell-scape site analysis (2013). Image courtesy of Vi Nguyen



Mapping, when utilised as a research tool, enables human olfactory experience of place to be disseminated as its relational capacities unveil pulses of olfactory activity.

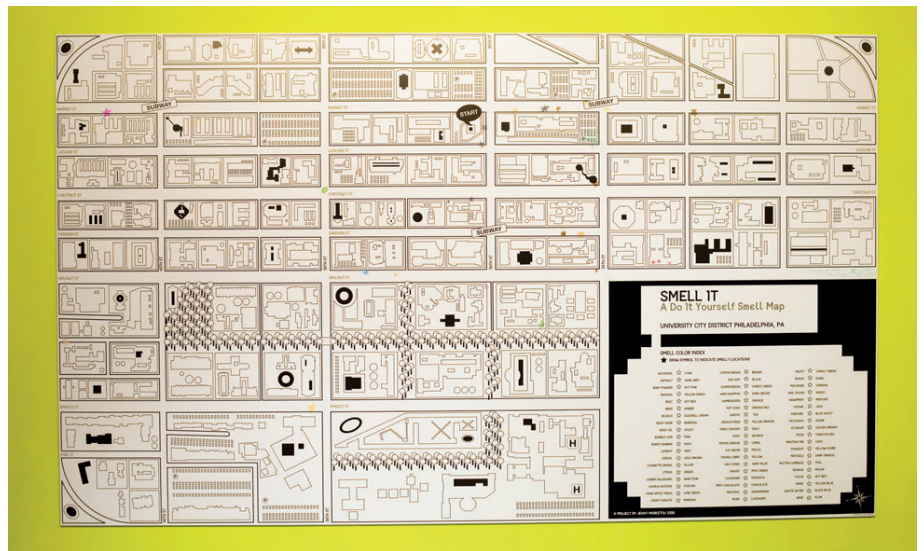
### *iii Crowd-sourced maps depicting smell locations*

'Odor Limits', a collaboration between Monell Center and Esther Klein Gallery in 2008, was a conceptual show at the point when olfactory art developed a coherent voice.<sup>85</sup> The gallery identified Drobnick as curator and he collaborated with four artists committed to working with scent; Clara Ursitti, Chrysanthe Stathacos, Oswaldo Macia and Jenny Marketou. Marketou's *Smell It* (Figure 2.9) was a site-specific, interactive wall installation geographically focused on the University City district.<sup>86</sup>

85 'Monell Chemical Senses Center', *Monell Center* <<https://www.monell.org/>> [accessed 9 January 2018]; 'Esther Klein Gallery' <<http://sciencecenter.org/discover/ekg>> [accessed 9 January 2018]; Jim Drobnick and Jennifer Fisher, 'Exhibitions | Odor Limits', *DisplayCult* <[http://www.displaycult.com/exhibitions/odor\\_limits.html](http://www.displaycult.com/exhibitions/odor_limits.html)> [accessed 20 December 2016].

86 Jenny Marketou, 'Smell It', 2008 <[http://www.jennymarketou.com/works\\_2008\\_7.html](http://www.jennymarketou.com/works_2008_7.html)> [accessed 24 August 2015].

**Figure 2.9:** SMELL IT – A Do It Yourself Smell Map. Site-specific, interactive installation 7 x 7 block blank map of Philadelphia. Jenny Marketou (2008). Image courtesy of Monell Center



A schematic plan of the neighbourhood was printed as a wall panel, and the installation invited visitors to walk locally, and record their olfactory experiences on *A Do It Yourself Smell Map*. Although clear guidance (Figure 2.10) was offered as to how specific colours and a star motif could be used to locate different smells on the plan, the resulting contributions were more creative and included words, coloured shapes and illustrations to denote smells found. In collecting a diversity of subjective responses to the neighbourhood’s smellscape through time the artwork is an example of how its contested nature can be foregrounded and demonstrates how it might be recorded through a palimpsest of inscriptions.<sup>87</sup> Marketou’s work makes a significant contribution to how a mappable smellscape might be approached as subjective and collective, and creates a precedent for further development of graphical representation of geographically-located smells.

**Figure 2.10:** SMELL IT – A Do It Yourself Smell Map (2008). Suggested smell index and colour correlation with some smells already added (pink = bubblegum). Jenny Marketou. Image courtesy of Monell Center



<sup>87</sup> Sébastien Caquard, 'Exhibit | Art & Cartography', 2008 <<https://artcarto.wordpress.com/category/exhibit/page/2/>> [accessed 9 January 2018].

Another approach to crowdsourcing smells is the creation of digital mashups; *I Smell Dead People – The Interactive Map* geotagged newspaper snippets across the USA and Canada in which odour and death were reported. In Japan, *Nioibu's* (translates as *Smell Club*) quest to mark the smelliest spots on a Google map base is no longer functional, although archived reports about its aims and the esoteric findings of its participants, the 'smellists', still exist serving as a call to continue the work.<sup>88</sup> Another interactive piece of investigative journalism about smell, the 2006 Gawker *New York City Subway Smellmap* (Figure 2.11) is also no longer live. Designed in the form of pop-up Zagat guide reports, each station was listed with its own smells taken from reader reports prompting a gently ironic suggestion that smell memorization might lead to a smell-only navigation on the subway system.<sup>89</sup> Interest in maintaining on-line mapping the sites of smell sources has a finite lifespan.



**Figure 2.11:** Screenshot from Gawker Subway Smellmap (2006). The key is particularly revealing listing alcohol, body odour (featured), chemicals, feces (featured), food (featured), mold & wet, perfumes, sewage, urine (featured) and vomit (featured). Gawker

The Chicagococoasmell blog set out to map not only the source, but also the city's chocolate aroma dispersal, requesting smell updates from readers which were visually translated as outlined semi-transparent,

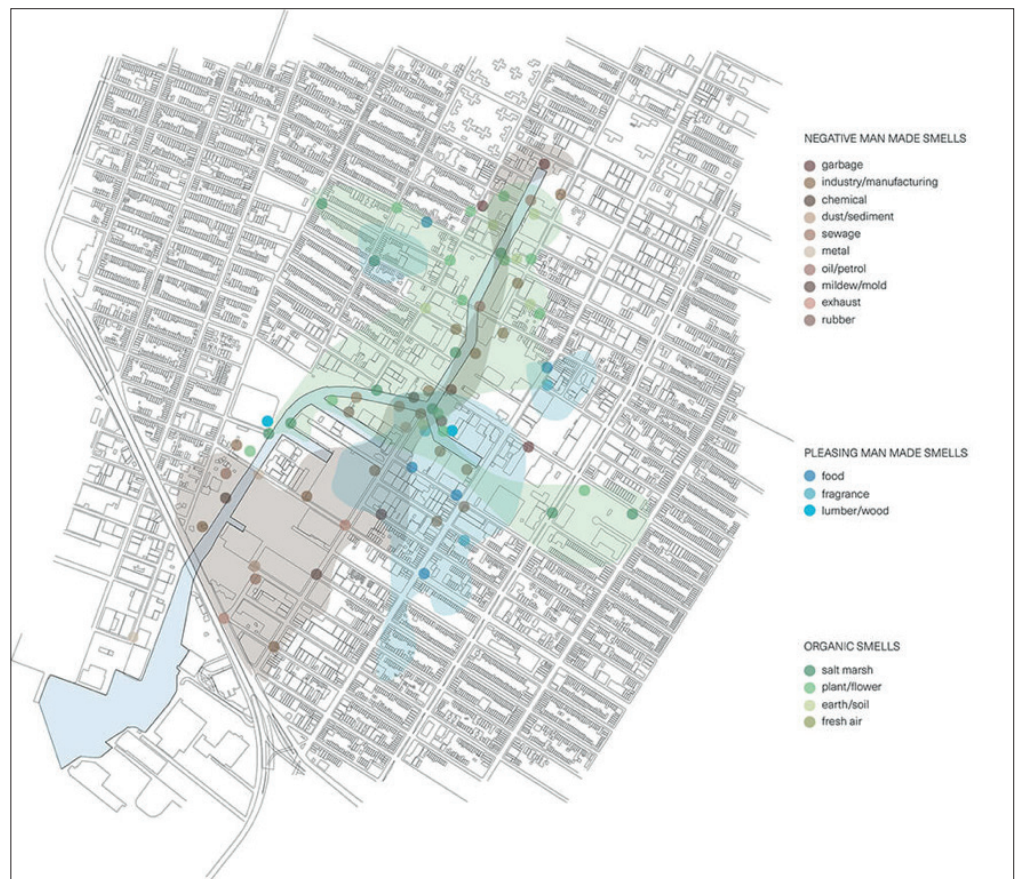
88 Justin McCurry, 'Japan's Smell Club Sniffs out World's Best and Worst Odours | World News | The Guardian', 2009 <<https://www.theguardian.com/world/2009/jan/13/smell-club-japan>> [accessed 28 December 2016]; Emily Co, 'Web Site Uses Google Maps to Chart Stink Spots', *TOKYOMANGO*, 2008 <[http://tokyomango.com/tokyo\\_mango/2008/12/web-s.html](http://tokyomango.com/tokyo_mango/2008/12/web-s.html)> [accessed 28 December 2016].

89 Chris Mohney, 'New York City Subway Smell Map: Live, and In Your Face', *Gawker* <<http://gawker.com/201431/new-york-city-subway-smell-map-live-and-in-your-face>> [accessed 27 December 2016].

brown, circular overlays onto Google maps.<sup>90</sup> Changes in the chocolate cloud's spatial range from its epicentre are largely dependent on wind direction and can be seen as a series of daily maps from October 2014 through January 2015.

Annie Barrett Studio entered an olfactory map into *Gowanus by Design 2015* urban development competition (Figure 2.12).<sup>91</sup> Similar to Gawker, smells are classified into three categories; 'negative man-made', 'pleasing man-made' and 'organic' to show the influence of the canal on its immediate neighbourhood. Smell source location and spatial distribution of three overlapping smell typologies are achieved through the use of dots and organically-shaped transparent coloured forms identifying the unpleasant smells of the canal's reach as no more than a New York city block.

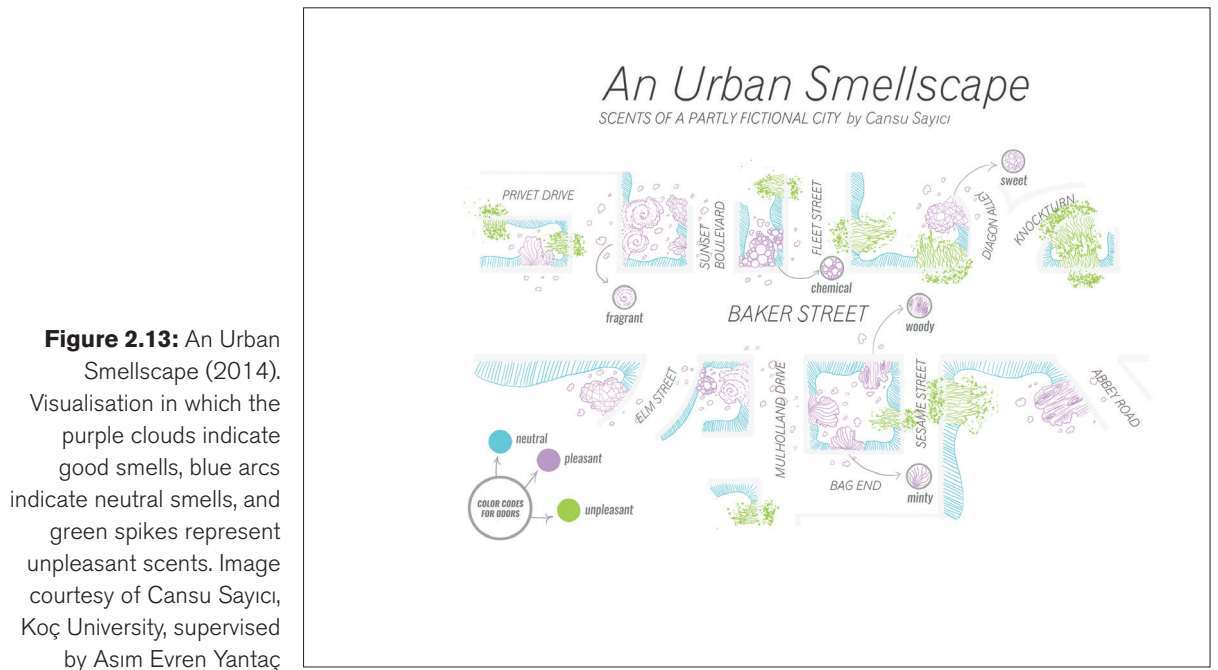
**Figure 2.12:**  
Gowanus  
Smellmap from  
Annie Barrett  
Studio (2015).  
Image courtesy  
of Annie Barrett  
Studio



90 Chicagococoasmell, 'Daily Chicago Chocolate Smell Map', *Chicagococoasmell-Blog*, 2015 <<http://chicagococoasmell-blog.tumblr.com/>> [accessed 28 December 2016].

91 Annie Barrett Studio, 'LIVE ENDS', *BAS*, 2016 <<http://www.anniebarrett.net/live-ends/>> [accessed 15 January 2018].

Yantac, Genc, and Sayici's research used smellwalks to focus on the mapping of hedonic tone; pleasant, neutral, and unpleasant.<sup>92</sup> Their stated aim to create a map that explained the multiple attributes of smell while avoiding too much information and achieving visual harmonisation was ambitious. Sayici's follow-on undergraduate project, *An Urban Smellscape* (Figure 2.13), is more resolved with illustrated textures used to indicate smell difference within categories.<sup>93</sup>



**Figure 2.13:** An Urban Smellscape (2014). Visualisation in which the purple clouds indicate good smells, blue arcs indicate neutral smells, and green spikes represent unpleasant scents. Image courtesy of Cansu Sayici, Koç University, supervised by Asim Evren Yantaç

The qualitative smell maps described above are frequently organised according to hedonic tone. They reveal an appreciation of smell as an everyday phenomenon, labelled according to an attributed smell source and only rarely allude to any temporality. The visualisation indicates spatial positioning of smells within urban contexts.

In 2015, I was invited by the Good City Life data science research group, then based at YahooLabs, to contribute to a quantitative *Smelly Maps* interactive map enabling online visitors to explore five dominant smell categories along streets in London and Barcelona. Maps which reveal the relative percentage of aroma categories from emissions, nature, food,

92 Asim Evren Yantaç, Özge Genç, and Cansu Sayici, *Location-Based Visualisation of Urban Experiences: A Case Study on Olfactory Data* (Istanbul: Koç University, 2015).

93 Cansu Sayici, 'Urban Smellscape', *Cansu Sayici* <<https://www.cansusayici.com/urban-smellscape/>> [accessed 17 December 2017].

animals and waste.<sup>94</sup> The extensive, quantitative dataset derived from geo-tagged social media hashtags was originally correlated with 1200 smell descriptors from my smellwalk data during the period 2010 to 2014.<sup>95</sup> The resulting map (Figure 2.14) is a recording from a single period of time fixing the map with data derived from photographs. As expected the area around the zoo mentions animals and the major road arteries, emissions. We acknowledged the project's limitations, suggesting that physical urban smellscapes are far more nuanced than indicated in such an overview, and pointed to a gap in the recording and mapping of fleeting aromas that may not be embedded in particular places.<sup>96</sup>



**Figure 2.14:** London streets interactive smell map (2015). Streets are colour-coded according to their dominant smell: red for emissions, green for nature, blue for food yellow for animals. Image courtesy of Rossano Schifanella

94 Luca Maria Aiello, Rossano Schifanella, and Daniele Quercia, 'Smelly Maps', *Good City Life*, 2015 <<http://goodcitylife.org/smellymaps/>> [accessed 30 December 2016].

95 Daniele Quercia and others, 'Smelly Maps: The Digital Life of Urban Smellscapes', in *Proceedings of the Ninth International AAAI Conference on Web and Social Media 26-29 May 2015, University of Oxford, Oxford, UK* (presented at the Ninth International AAAI Conference on Web and Social Media, Oxford May 2015, Palo Alto, CA: AAAI Press, 2015).

96 Daniele Quercia and others, 'Smelly Maps: The Digital Life of Urban Smellscapes', in *AAAI Publications* (presented at the 9th International AAAI Conference on Web and Social Media, Oxford, UK, 2015).



An alternative, experiential, approach to exploration of the smellscape is olfactory installation in which the viewer might sniff as well as see. Olfactory artist Sissel Tolaas is known for her *City SmellScapes* projects in which she tracks down urban smells and reproduces synthetic versions of the scents, presenting her 'subjective portrait of the city'; a perspective that she freely acknowledges would be different from that of another person.<sup>97</sup> Tolaas has undertaken fifty-two such projects undertaken since 1991 focussing on replication;

Through chemicals I reproduce the reality I am after. [...] And by decontextualising this reality, you know, I challenge people's curiosity towards it so in the end hopefully they will go here (sniffs), smell round like dogs to discover a different dimension.<sup>98</sup>

During the research phase she undertakes 'manual smell sampling' of background odours, identifies a smell's source and returns to the site several times prior to odour sampling using headspace technology collecting volatile aroma molecules.<sup>99</sup> Tolaas' singular perspective on a city's smells and their subsequent synthetic remediation might exhibit as liquid scents (Berlin) or take the form of a scratch and sniff map (Mexico City).<sup>100</sup> The work is significant in its aim to open Western receptiveness to smell in a variety of urban settings.

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97 Conversations in Contemporary Art, *The World from the Perspective of the Nose with Sissel Tolaas* (Visual Arts Building, Room 114, 1395 René Lévesque West, Sir George Williams Campus, Concordia University, 2014) <<https://www.youtube.com/watch?v=ubhAD-y0WR4>> [accessed 10 December 2016]; Design Indaba, *Scent Expert Sissel Tolaas Visits Cape Town*, 2012 <<https://www.youtube.com/watch?v=eQ-MZgd1RNw>> [accessed 10 December 2016].

98 Design Indaba, sec. 5:29.

99 Conversations in Contemporary Art, sec. 8:17.

100 Sissel Tolaas, *NoSoEaWe*, 2004 <<http://www.fragrantica.com/news/Berlin-City-Smell-Research-3336.html>>; Nicola Twilley, 'Talking Nose', *Edible Geography - Thinking Through Food*, 2010 <<http://www.ediblegeography.com/talking-nose/>> [accessed 14 March 2014].

Nicola Twilley's 2010 olfactory installation, a scratch'n'sniff map of New Yorker's smell preferences (Figure 2.15), was based on data obtained by the Vosshall Lab at Rockefeller University. The resulting exhibit served as an olfactory demography of New York and served to partially redress a common understanding of New York as simply malodorous. By foregrounding smell over sight, and encouraging active participation, Twilley engaged exhibition visitors in smelling as an activity.



**Figure 2.15:** Scratch'n'sniff map of NYC (2010). Scratching and sniffing NYC's smells. Nicola Twilley. Image courtesy of Andreas Keller

Other artistic place-related olfactory installations are beyond the scope of this review with the exception of Brian Goelzenleuchter's *Sillage* series in which he created a set of individual fragrances representative of a city's districts based on odours determined through surveys with the local population.<sup>101</sup> Exhibition attendees are sprayed with the fragrance to correlate with their street address. Wearing a synthetic, synoptic version of your olfactory neighbourhood is a provocation to common rigid perceptions of smell and is achieved through the changes in the fragrance over time. Goelzenleuchter's preoccupation is with smell's embodiment of memory, but in combining background and episodic smells he physicalises smellscape theory through his creations. His work is a moving smellmap carried by ambulant museum visitors.

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101 Brian Goelzenleuchter, 'Sillage: Los Angeles', *Brian Goelzenleuchter*, 2014 <<https://www.bgprojects.com/home/2017/9/5/sillage-los-angeles>> [accessed 24 January 2017].

## 2.5 *Gaps in knowledge and research questions*

This review of the historical and contemporary practices of smell mapping demonstrates a range of motivations, disciplinary perspectives, methods and representational forms; from a methodological tool to research a neighbourhood to an artistic way of developing olfactory awareness. Using Hallé's list of smells it is possible to form comparisons between the 'morbific vapours' of 1790 Paris and everyday life today simply by taking a smellwalk while reading his descriptions.<sup>102</sup> When online maps disappear comparative studies are impossible; the digital interactive smellmaps, such as the Nioibu project, New York Subway and Manhattan Sewers leave no trace of global smell markers suggesting that, despite the benefits of digitisation, other forms of representation might have greater longevity. Many early smellmaps indicated smell sources or detection points on the city grid. Only Marketou's graffiti wall facilitates contestation and is joined by Goelzenleuchter's worn neighbourhoods to address smell changes over time. When smellscape mapping is understood as a practice, the external environmental context of smells (their location, wind, temperature, humidity) provides greater depth for analysis as seen in the Diaconu study and Wu's doughnut map. Excepting the work of Marketou, Wu and Diaconu, the literature and practices of urban smell mapping regard the map as representational; usually adopting a panoptical perspective, depicting smells as discrete reductive units delineated as single words or single molecule synthetic olfactory reproductions. However, post-2013 maps indicate increasing appreciation of the experience of smell and its dimensional and fragmented nature, portraying overlapping smells.

The smellscape as a theoretical entity, in conjunction with smell perceived through physical human action, is worthy of further study. As a dynamic, ecologically-situated atmosphere it includes the 'inhabitant's

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102 Jim Drobnick and Jennifer Fisher, 'Odor Limits', *Senses and Society*, 3.3 (2008), 349–59.

perspective and her environmental perception'.<sup>103</sup> The evanescent and mutating qualities of the smellscape require recognition and representation alongside its structural form. There is a role for art and design practice to develop creative, performative, multimodal approaches to suggest how multiple, subjective viewpoints may be represented to create understandings of olfactory space. The variability inherent in the smellscape is often problematised, as is its transience, ephemerality and multiple temporalities without suggestion as to how mapping practices might serve to resolve such concerns.<sup>104</sup>

Despite a significant review the smellscape as a collectively-perceived entity remains eye-invisible. What happens if we could not only see smell but also experience its temporal qualities? Maybe mapping, in place of representing, might take on agency and bring the smellscape into being? Colour, visual iconography and shape might develop to form an experiential visual language that evokes a sense of the olfactory landscape. How might individual smells be spatialised into a smellscape? Through which types of practices might the resulting smellscape be mapped? In response to these thoughts my research specifically asks:

**How might subjective, dynamic, vernacular, urban smellscapes be rendered 'eye-visible'?**

To answer this central question, I address two secondary questions:

- 1. Which mapping practices and formats best reflect human subjectivity, ephemerality of smell and the uniqueness of particular smellscapes?**
- 2. What constitutes the smellscape, and how might it be conceived as a spatial and temporal environment?**

This research explores the qualities of smell (one of the chemical senses) as an ecologically-sensed phenomenon within vacillating

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103 C. Bushdid and others, 'Humans Can Discriminate More than 1 Trillion Olfactory Stimuli', *Science*, 343.6177 (2014), 1370–72.

104 Adam Jasper and Nadia Wagner, 'Cabinet // Notes on Scent', *Cabinet*, 2008 <[http://cabinetmagazine.org/issues/32/jasper\\_wagner.php](http://cabinetmagazine.org/issues/32/jasper_wagner.php)> [accessed 18 June 2018].

atmospheric conditions of air (as its medium) in urban environments through human perception. I seek ways of rendering the resulting smellscape as 'eye-visible' through the projective and performative capacities of creative mapping. The olfactory dataset is vast and it is unlikely physiologically or genetically that two people will ever register identical smells. Humans have the capacity to discriminate between one trillion smells and yet we only inhale, on average, twenty-four thousand times per day necessitating a lifespan of over one hundred and fourteen thousand years in order to register every possible scent, assuming that we registered a different scent with every breath.<sup>105</sup> The smellscape is incrementally different depending on the person smelling, and individual smells might be combined for collective appreciation of this complexity.<sup>106</sup>

In this chapter I examined how scholars have theorised the smellscape and the problematic of its visualisation. After critiquing a range of historical data visualisations, artist interpretations, digital crowdsourced and graphical representations of the smellscape, I conclude that most prefer to highlight the source of the smell over its other perceived qualities within the environment. The main contributions to knowledge within communication design, by Wu and Sayici, indicate a gap to be partially addressed in this research. This is where my own work contributes to moving the debates and practices forwards. In the next chapter, I explain the methods I used to detect, record, analyse and remediate the smellscape as perceived by multiple people.

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105 Bushdid and others, p. 1370; Christina M Agapakis and Sissel Tolaas, 'Smelling in Multiple Dimensions', *Current Opinion in Chemical Biology*, 16.5–6 (2012), 569–75 (p. 569).

106 Leslie Stein, 'The Science of Smell', *Odor Limits* (Philadelphia, May 2008).

## Chapter Three

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# Practices of apprehension: evolutions of olfactory exploration

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In Chapter Two I considered the literature, theory and mapping of smellscapes across a range of disciplines. This revealed a gap in knowledge within design studies in which visual representations of the human smellscape might be expressed as a field of sensory communication for olfactory information. My approach is 'research-through-design' (RTD), a form of action research that correlates with the unpredictable ways in which designers think and which recasts the creative practice of design as research.<sup>107</sup> In 2016 Frayling, former Rector of the Royal College of Art, traced his 1993 proposal of RTD back to Herbert Read's 1944 definition of 'research through art', as being concerned with the things you learn through the medium of studying, as opposed to studying specific techniques and skills. Although critiqued in 2008 by Friedman as being simply an ambiguous new category of research for designers, the RTD approach has gained traction and is the focus for a biennial conference which dialogically disseminates practice-based research findings.<sup>108</sup> The conference contributions continue to build a case for design as a knowledge-generating activity. In this chapter I justify my rationale for a Case Study methodology and provide an overview of the research ethics involved. I indicate why Lefebvrian rhythmanalysis, James Corner's, Jill Desimini's and Charles Waldheim's projective approaches to mapping, and my own refinement of

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107 Christopher Frayling, 'Research in Art and Design', *Royal College of Art Research Papers*, 1, 1 (1993), 1–9; Abigail Durrant and James Price, *RTD 2015 Provocation by Sir Christopher Frayling Part 1: Research Through Design Evolution*, RTD Conference Series, 2015 <<https://vimeo.com/129775325>> [accessed 8 November 2016].

108 Ken Friedman, 'Research into, by and for Design', *Journal of Visual Art Practice*, 7.2 (2008), 153–60; 'What Is RTD?', RTD 2017 <<https://www.researchthroughdesign.org/2017/whatisrtd/>> [accessed 11 July 2018].

Victoria Henshaw's smellwalking practice are relevant methods by which the smellscape might be detected, collected, recorded, analysed and rendered eye-visible.<sup>109</sup>

These methods are more closely linked than may be initially apparent: RTD is an iterative and rigorous method in which the act of designing is research which 'takes advantage of the unique insights gained through design practice to provide a better understanding of the complex and future-oriented issues in the design field'.<sup>110</sup> Thus, RTD shares 'the capacity to reformulate what already exists' with agentic mapping.<sup>111</sup> Rhythmanalysis is performative and requires the researcher to be both inside and outside the practice, 'oscillating between actively participating and interpreting' in a similar way in which RTD is practiced by the designer to actively produce knowledge.<sup>112</sup> Godin and Zahedi cite a further critique levelled at RTD, its potential lack of validity in results stemming from lack of reproducibility, as being surmountable through rigour and recoverability of process and resulting artefacts in that, 'if the project works and the artefact produced is acceptable, then knowledge produced through the process is also valid!'<sup>113</sup>

Both my case studies – one considering spatial and the second temporal aspects of the smellscape, as indicated in Chapter One – use smellwalking as a method for data collection; a sense-walking practice that

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109 Lefebvre, *Rhythmanalysis*; Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'; *Cartographic Grounds: Projecting the Landscape Imaginary*, ed. by Charles Waldheim and Jill Desimini (New York: Princeton Architectural Press, 2016); Victoria Henshaw, 'Route Planning a Sensory Walk: Sniffing Out the Issues', in *Walking Inside Out: Contemporary British Psychogeography*, ed. by Tina Richardson (Lanham, Maryland: RLI, 2015), pp. 195–210.

110 Danny Godin and Mithra Zahedi, 'Aspects of Research through Design: A Literature Review', *Proceedings of DRS*, 2014, 1667–1680 (p. 1667).

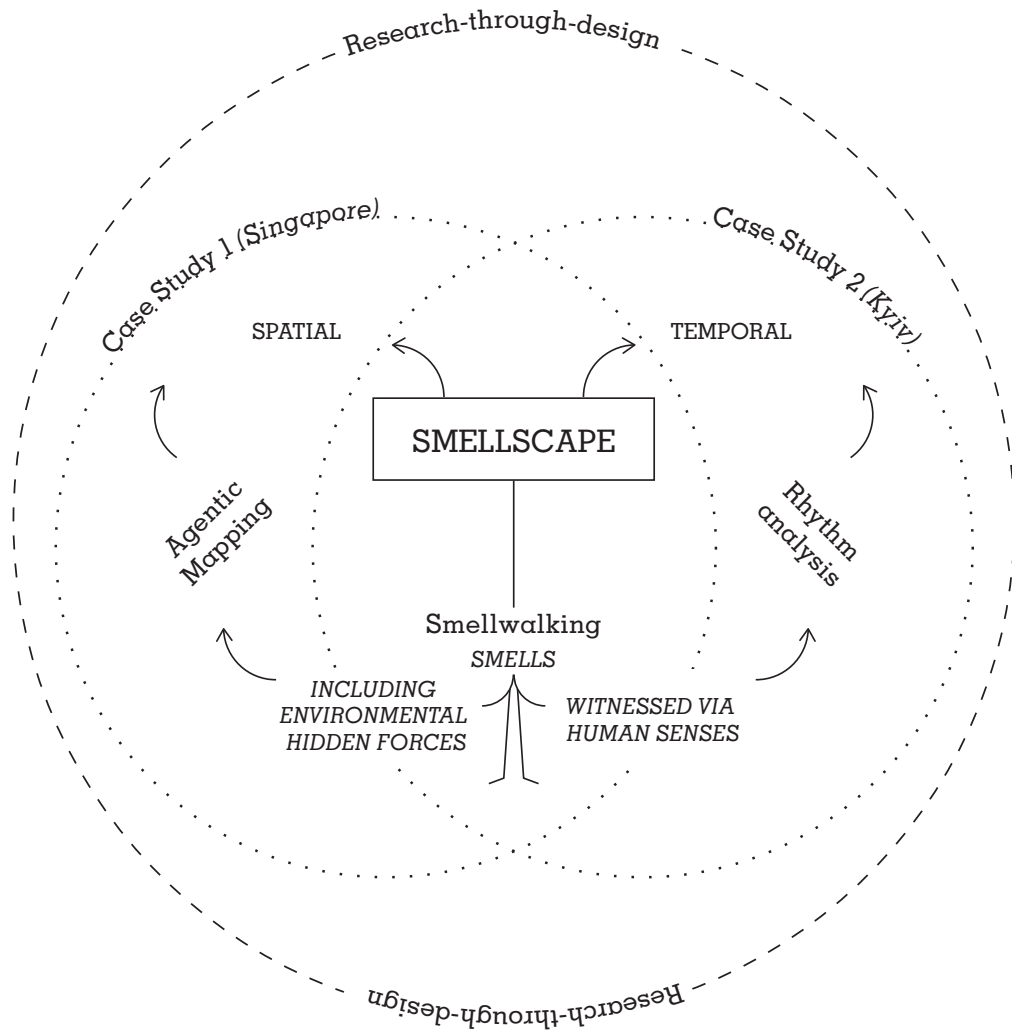
111 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 214.

112 Daniel Koch and Monica Sand, 'Rhythmanalysis – Rhythm as Mode, Methods and Theory for Analysing Urban Complexity', in *Proceedings of the International Conference* (presented at the Urban Design Research: Method and Application, Birmingham City University: Birmingham City University, 2010), pp. 61–73 (p. 64).

113 Godin and Zahedi, p. 1674.



uses maps to guide, record and explore.<sup>114</sup> The relationships between the methods are represented in Figure 3.1:



**Figure 3.1:** Nose-first research methodology (2018). Illustrating the connections between theory (upper case), methods (sentence case), contexts (sentence case, italic) and units of analysis (upper case, italic)

I now proceed to examine qualities of the smellscape derived from analysis of smellscape mapping workshops I ran once a year between 2014 and 2017. This leads me to propose the qualities of smell to be considered when smellscape mapping through practices of walking and visualisation.

114 Mags Adams and Kye Askins, 'Sensewalking: Sensory Walking Methods for Social Scientists', 2008 <<http://www.iaps-association.org/sensewalking-sensory-walking-methods-for-social-scientists/>> [accessed 6 January 2015]; Victoria Henshaw and T. J. M Cox, 'Researching Urban Olfactory Environments and Place through Sensewalking', 2009 <<http://www.manchester.ac.uk/escholar/uk-ac-man-scw:122854>> [accessed 21 December 2014].

The remainder of this chapter provides an historical overview of my iterative smellwalking practices and how RTD led to a variety of methods for the apprehension and documentation of the smellscape. I regard the smellwalk as a process of discovery, open to anyone who is interested to participate, and one in which the map and the walk work reciprocally to produce new knowledge of smells and the environment.<sup>115</sup> Some of the smellwalks I refer to derive from my design practice prior to this thesis, some were undertaken during the course of my PhD studies; together they contextualise the method used in the Case Studies.

I conclude with a discussion as to the contribution afforded by the proposition of a sensory communication-oriented smellwalking method.

### 3.1 *Methods overview*

As befits my specialism as a communication designer one of my underpinning approaches is research-through-design (RTD); conceived by Sir Christopher Frayling in 1993, who positioned RTD as a form of action research in which researchers might design artefacts to learn about aspects of human experience.<sup>116</sup> In 2016 Frayling updated and contextualised his definition to, 'Taking design as a particular way of thinking and a particular approach to knowledge which helps you to understand certain things that exist outside design'.<sup>117</sup> As such I suggest that perception of the smellscape can be understood through design. My research synthesises aspects of the natural world as witnessed through subjective, human experience to create imagined, artificial worlds. In this combination I span all three of the disciplinary knowledge cultures: science, art and design, as articulated by Nigel Cross (see Table 3.1).<sup>118</sup>

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115 Some specialist industries, including perfume and wine, have professional development requirements in nose training, however the smellwalk requires only a personal interest and curiosity.

116 Frayling, p. 5.

117 Durrant and Price.

118 Nigel Cross, 'Design Research: A Disciplined Conversation', *Design Issues*, 15.2 (1999), 5–10.

	<b>Things to know</b>	<b>Ways of knowing</b>	<b>Ways of finding out</b>
<i>Science</i>	<b>Natural world</b>	Rationality Objectivity	Experiment Analysis
<i>Art</i>	<b>Human experience</b>	Reflection <b>Subjectivity</b>	Criticism Evaluation
<i>Design</i>	<b>Artificial world</b>	<b>Imagination</b> Practicality	<b>Modelling</b> <b>Synthesis</b>

**Table 3.1:** Situating 'Nose-first' (highlighted in blue) within Cross' disciplinary knowledge paradigms

A potential implication of such a span is a lack of focus and I address this through the systematic imperative of RTD taking care to advance knowledge through practical and active invention, engaging 'a type of research which is both scientifically rigorous and fruitful for the profession and its users'.<sup>119</sup>

In order to evaluate design research, Candy proposes that the findings must be able to be shared, verified or challenged and, since much of what we know through design is tentative and speculative, the properties of being shareable and challengeable are more important than the absolute truth of the new knowledge.<sup>120</sup> So it is through repeated design interventions (Chapters Four and Five), iterations with slight differences, that I seek to investigate and communicate aspects of the smellscape. The projective aspects of design align with the optimistic and projective agency inherent in mapping as itemised by James Corner, in which it uncovers 'realities previously unseen or unimagined, even across seemingly exhausted grounds'.<sup>121</sup> Corner sets forth argumentation as to the map's capacity to project 'a mental image into the spatial imagination' and it is precisely this facility that I harness in bringing a spatial rendering of olfactory airspace into being.<sup>122</sup> Aesthetics form an essential component of

119 Alain Findeli, 'UNE MÉTHODE POUR LA RECHERCHE EN DESIGN La recherche en design: questions, obstacles, perspectives', in *Erstes Design Forschungssymposium* (presented at the Symposium de recherche sur le design, Zurich: Swiss Design Network, 2005), pp. 40–51 (p. 44).

120 Candy.

121 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 213.

122 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 215.

visual outcomes. My previous education and practice enable me to draw on a deeper understanding of Gestalt and colour theories employing design fundamentals such as typography, rhythm and compositional balance when modelling the smellscape.

The Case Study method defined by Robert Yin as 'an empirical research method used to investigate a contemporary phenomenon, focusing on the dynamics of the case, within its real life context, when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used' enables me to examine smell data in relation to its place of collection.<sup>123</sup> The case study's increased use within design, particularly for exploratory research involving in-depth investigation through multiple sources of evidence, can result in detailed analysis of interrelationships. Contemporary design practitioners using the case study method include Fass, whose explanatory design added qualitative detail to quantitative data, and Elsdén, who generated documentary informatics, both of which resulted in visualization of invisible datasets.<sup>124</sup> In this thesis I adopt a multiple-case design in which similar units of analysis are considered in contrasting situations so as to gain an understanding of how smellscape dimensions might be mapped.<sup>125</sup> The advantage of the case study as an approach that draws from theory to generate practice outweighs critique of it as a method lacking in breadth.<sup>126</sup> My research is concerned with everyday lived experience of smell and how this might be rendered eye-

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123 Robert K. Yin, 'The Case Study as a Serious Research Strategy', *Knowledge: Creation, Diffusion, Utilization*, 3.1 (1981), 97–114 (p. 97).

124 John Fass, 'A Funny Thing Happened on the Way to the Website: Telling about Browsing' (presented at the CHI EA '14, New York: ACM Press, 2014), pp. 675–84; Chris Elsdén and others, 'Designing Documentary Informatics' (ACM Press, 2017), pp. 649–61.

125 Robert K. Yin, *Case Study Research: Design and Methods*, Fourth edition (Los Angeles: SAGE Publications, Inc, 2009).

126 Bella Martin and Bruce M Hanington, *Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions* (Beverly, MA: Rockport Publishers, 2012).

visible through practices of mapping draws on existing theories of the smellscape's qualities and tests them through practice.<sup>127</sup>

While my research in this field commenced in 2010 with several formative studies, this thesis comprises two targeted case studies, focussing on the spatial and temporal dimensions of the smellscape with distinct methods of analysis for each. The overall strategy enables me to iteratively test technologies, and to hone my thinking, thus assimilating existing theory with design practice. Both case studies source smell information from ordinary people in everyday environments via the smellwalk, in which information sensed through the nose is foregrounded. The smellwalk has a theoretical and practical precedent in Porteous and Henshaw, which I developed as a design practice during the course of this research. As the smellwalk involves human subjects, RCA ethics procedures were followed; notably health and safety, risk assessment, researcher public liability insurance, participant consent and data confidentiality.<sup>128</sup>

The first case study investigated the spatial elements of the Singaporean smellscape in June 2015 utilising creative and interpretive approaches to mapping, as argued by Corner, in which mapping is an active practice, and through abstraction it both reveals and has potential to shape new realities.<sup>129</sup> Corner cites how artists have used the design process of mapping to construe and construct new worlds, presenting mapping as agentic based on a premise that the 'reality' of landscape or space is not given, but rather co-constituted by the relationship between people and their interaction with 'material objects, images, values, cultural codes, places, cognitive schema, events and maps'.<sup>130</sup> Corner identifies three constant mapping operations; fields (the setting of parameters, systems and rules), extracts (isolating data to be mapped) and plottings (the drawing out of the data to establish new relationships) which I examine

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127 John W. Creswell, *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*, 2 edition (Thousand Oaks: Sage Publications, 2006), pp. 57–81.

128 See section 3.2 of this thesis.

129 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'.

130 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 223.

in detail with specific relation to the smellscape in Chapter Four.<sup>131</sup> Mapping also requires visual codes; Desimini and Waldheim argue for the projective power of cartographic conventions in rendering the landscape whereby a particular topography might be represented through road symbols, contours or hatching. Understood as such, depiction of new landscapes and their actualisation meet through design.<sup>132</sup>

The second case study considers the temporal dimension of the Kyiv smellscape in winter 2016 using Lefebvre's rhythmanalysis, a tool that unites the temporal and the spatial through the body providing a 'privileged insight into the question of everyday life'.<sup>133</sup> Rhythmanalysis, theorised by Lefebvre in order to distinguish between the present and presence, is often deployed by urbanists and sociologists to understand the pulse and life of the city. As a concept that is sensed rather than known, rhythmanalysis acknowledges the tensions in combining an overview with the immediacy and energy of lived experience.<sup>134</sup> Lefebvre proposes how rhythms surround us, 'Everywhere where there is interaction between a place, a time and an expenditure of energy, there is a rhythm' and, as smells index activity they form a part of a rhythmic environment.<sup>135</sup> Resulting olfactory patterns might then be visualised by designers to communicate an eye-visible, dimensional, interpretation of olfactory airspace which, in turn, may help to transition from one-off lived experience to a broader conceptual appreciation of the entirety of the smellscape. Just as a core function of a creative cartographer's work is to explore and expose relationships, so the rhythmanalyst examines the connections and patterns indicated by the rhythms. Relationality is a key feature of both processes.

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131 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', pp. 229–31.

132 Waldheim and Desimini.

133 Stuart Elden, 'Rhythmanalysis: An Introduction', in *Rhythmanalysis: Space, Time and Everyday Life*, by Henri Lefebvre (New York: Bloomsbury Academic, 2013), p. 2.

134 Daniel Koch and Monica Sand, 'Rhythmanalysis – Rhythm as Mode, Methods and Theory for Analysing Urban Complexity', in *Proceedings of the International Conference*, ed. by Mohsen Aboutorabi and Andreas Wesener (presented at the Urban Design Research: Method and Application. Birmingham City University: Birmingham City University, 2010), pp. 61-73

135 Lefebvre, *Rhythmanalysis*, p. 25.

Rhythmanalysis raises 'issues of change and repetition, identity and difference, contrast and continuity' and with the body as the point of contact it serves to connect environmentally-shifting smells with humans as their detectors.<sup>136</sup> Rhythmanalysis is dependent on practice, the physical witnessing of environments with specific focus on the body moving through space; both essential criteria in this study.<sup>137</sup> Lefebvre's insistence on rhythm as a tool of analysis, rather than an object of it, can result in inconsistencies as he calls for the simultaneity of observation and critical interpretation on the part of the rhythmanalyst.<sup>138</sup> However, its stated aims of working from abstract to concrete, from theory to practice, with an emphasis on interdisciplinarity, align with my research.

Thus a collection of five diverse methods unite to form the methodology for this research; each of which is empirical, considers both context and data, and is performative. But the study cannot commence without people. I was highly dependent on participants, ethics were of high priority, and it is to this I turn next.

### 3.2 *Ethics and values*

To conduct the research I led the participants on walks through cities, so ethical and safety considerations were paramount. In line with RCA ethics guidelines, all smellwalk participants were presented with a research information sheet, had time to consider their involvement and voluntarily signed informed consent forms to affirm their willingness to participate, in the knowledge that at any time they could leave the study. I ensured the participants were fully aware of what was involved through clear

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136 Elden, p. 5.

137 Claire Revol, 'Rue Rambuteau Today : Rhythmanalysis in Practice | Rhuthmos', *Rhuthmos [En Ligne]*, 20 (2016); Tracey Potts, 'Rhythmanalysis: Space, Time and Everyday Life', *The Journal of Architecture*, 20.3 (2015), 550–54.

138 Revol.

demonstrations of the various sniffing activities.<sup>139</sup> I obtained ethical clearance for the research through the Royal College of Art's Ethics Committee.

Prior to leading smellwalks I engaged in a lengthy process of route selection and revision to ensure the safety of participants and researcher. As indicated by Henshaw participants on smellwalks can 'fail to notice everyday environmental risks and in particular, road traffic'.<sup>140</sup> So, prior to smellwalk departure, I advised participants to use their eyes to note hazards. I also warned them when the route involved road crossings, shepherding when required. To document and organise smell perception I created several databases of smell descriptions as befits a Case Study approach, and photographic evidence of smelling actions and activities removing any personal information.<sup>141</sup> As recommended when reporting on research, participants appearing in photographs or by mention were anonymised.<sup>142</sup>

The spatial representation of smells as a human-sensed dataset leads me to consider my own responsibility with regard to the data; as in the past eight years I have amassed several city databases of smell descriptions. My intention to facilitate shared understanding of individual difference (as opposed to smell-related judgement) and to 'become more humane and to connect with ourselves and others at a deeper level' (rather than to become more efficient, in the field of odour control) led me to value the subjective as worthy of study.<sup>143</sup> This approach has been defined by Lupi as 'Data Humanism' (Figure 3.2) in her 2017 manifesto.<sup>144</sup>

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139 Colin Robson, *Real World Research: A Resource for Users of Social Research Methods in Applied Settings* (Chichester, West Sussex: Wiley, 2011).

140 Henshaw, 'Route Planning a Sensory Walk: Sniffing Out the Issues', p. 198.

141 Yin, *Case Study Research*.

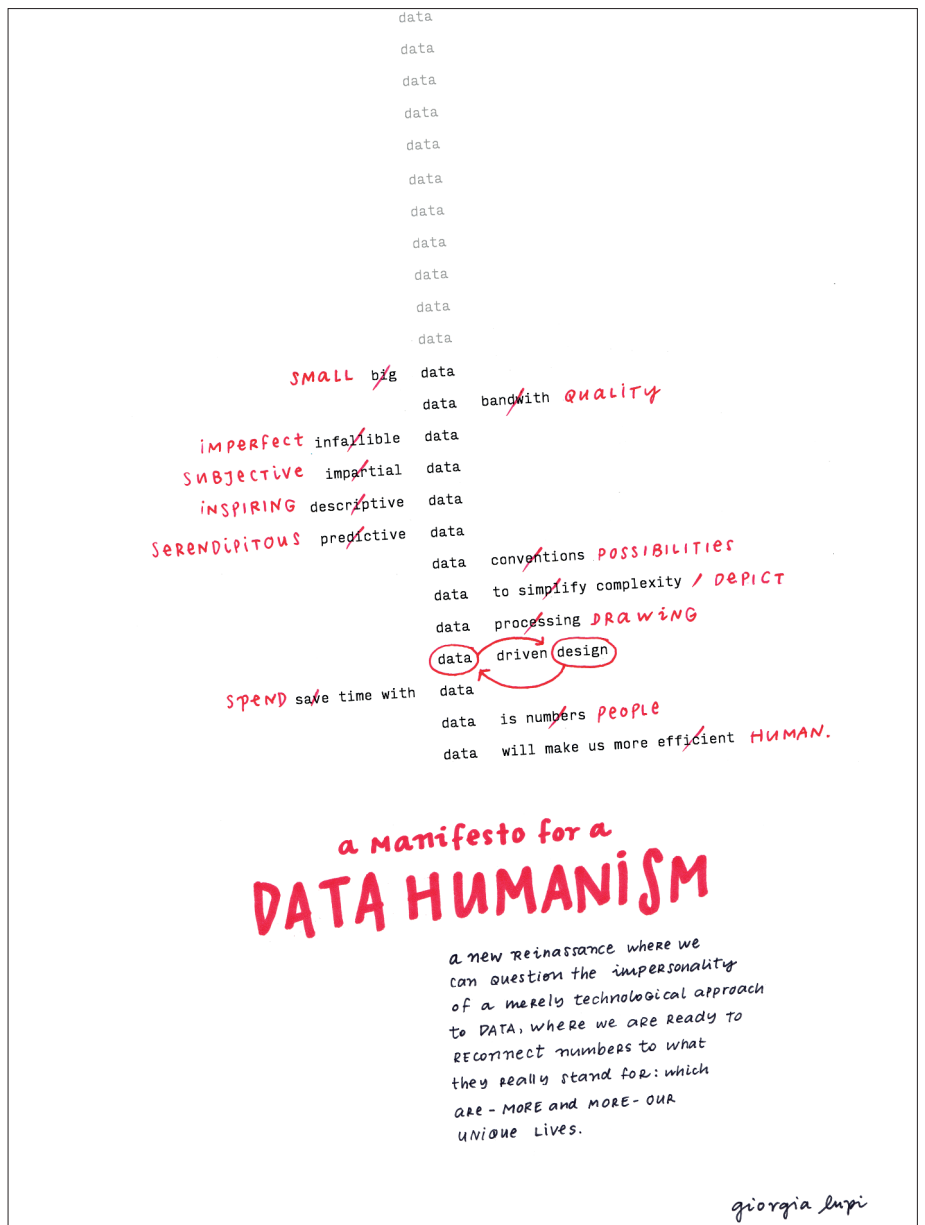
142 Robson.

143 Stefanie Posavec and Giorgia Lupi, *Dear Data*, (London UK: Particular Books, 2016), p. xi.

144 Giorgia Lupi, 'Data Humanism: My Manifesto for a New Data World', *Giorgialupi* <<http://giorgialupi.com/data-humanism-my-manifesto-for-a-new-data-world/>> [accessed 8 February 2018].



**Figure 3.2:** Data Humanism Manifesto suggesting the value of qualitative data (2017).  
Giorgia Lupi



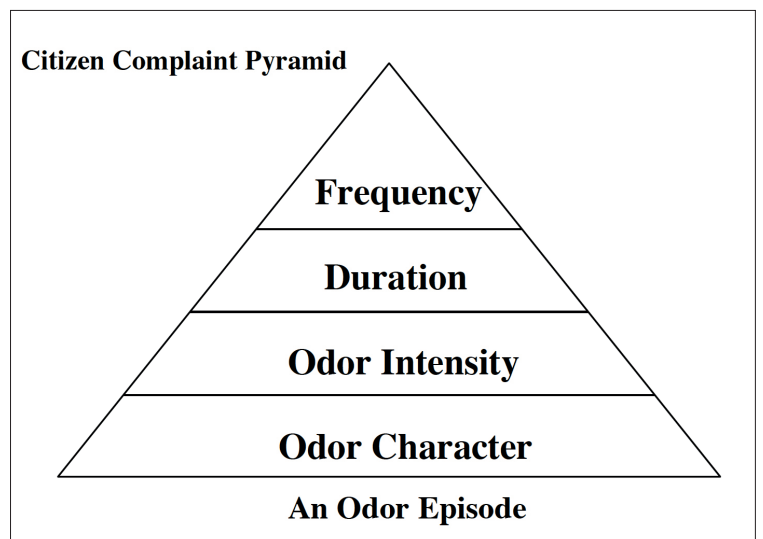
Acknowledging data as imperfect and celebrating its complexity is one aim of my research practice and I make this explicit to smellwalkers at the start of every piece of research. But what to record?

### 3.3 *Qualities of smell: interdisciplinary representations*

Attempts to represent smell demand an appreciation of its potential ‘sense-able’ qualities. This section outlines some perspectives on smell and their representation before detailing the decision-making process, testing and iteration of deciding on the recordable elements of odour. Cultural variation in odour categorisation reveals the differences between a Western, analytic

approach, which favours classification, from an Eastern holistic view that incorporates the wider context in which the smells reside.<sup>145</sup> I advocate an exploratory approach, combining disciplinary and individual sensory knowledge in this nascent field of sensory communication.

Attempts to describe smell frequently point to its lack of permanence as problematic. However, practices of environmental management odour regulation and odour compliance have developed objective odour nuisance metrics citing character, intensity, duration and frequency to quantitatively measure persistent, repeat, offensive odours. The *Citizen Complaint Pyramid* (Figure 3.3) includes four contributory qualities that together form a means of describing an odour episode, enabling follow-up action to be taken.<sup>146</sup> I suggest these qualities might be repurposed to solicit and record positive, as well as negative, smells.




**Figure 3.3:** Components of an 'Odor Episode' within a citizen complaint structure might be repurposed to solicit both positive and negative smellscape perceptions. McGinley and McGinley (2000)

145 C. Chrea and others, 'Culture and Odor Categorization: Agreement between Cultures Depends upon the Odors', *Food Quality and Preference*, 15.7–8 (2004), 669–79.

146 Charles M. McGinley and Michael A. McGinley, 'Field Odor Monitoring and Enforcement' (presented at the 22nd Annual Hawaii Water Environment Association Conference, Honolulu, Hawaii, 2000), p. 2.

### 3.3 Investigating experiential smell qualities





My early smellmapping practice (2011 – 2013), led to further requests for smellmapping workshops from design and interdisciplinary methods educators.<sup>147</sup> I used the teaching contexts as an opportunity to explore the qualities of smell and individual interpretation of environmentally-located smelling with students as part of GoGoGozo multidisciplinary mobile mapping field-based learning, and DSAA(1) Lycée St. Exupéry, Marseille. As Corner suggests, extracting data selectively and separating ‘their original seamlessness with other things’,<sup>148</sup> is an early part of the mapping process. To determine what aspects of smell were important, I encouraged participants to select what they wanted to record on a smellwalk presenting thirteen options, listed in Table 3.2, as a visual slideshow. I appropriated exemplar smell quality descriptors from odour monitoring and from alternative sensory terminologies; this use of synaesthetic metaphor is common amongst linguists.<sup>149</sup> I encouraged the students to question, comment and finally select three qualities of smell to record.





Qualities	Characteristic	Attributes	Examples (visual in the form of photographs unless otherwise specified) with my notes (direct from presentations delivered to students)
<i>Perceived qualities</i>	Source	<ul style="list-style-type: none"> <li>• Spatial</li> <li>• Object-based</li> <li>• Geo-located</li> <li>• Uses other senses for verification</li> </ul>	

147 DSAA Marseille is made up of 4 design schools covering Product, Graphic, Event and Interior design 2015, ERC-funded GoGoGozo 2015, 2016, 2017 Playful Mapping including students from Geography, New Media Studies, Geo-mapping, Game Studies, Environmental Science

148 Corner, ‘The Agency of Mapping: Speculation, Critique and Intervention’, p. 230.

149 Francesca Strik Lievers, ‘Synaesthesia: A Corpus-Based Study of Cross-Modal Directionality’, *Functions of Language*, 22.1 (2015), 69–95.

	Range	<ul style="list-style-type: none"> <li>• Spatial</li> <li>• Extension from source</li> <li>• Distance from point of detection</li> <li>• May become less noticeable (threshold detection)</li> </ul>	
	Length/duration	<ul style="list-style-type: none"> <li>• Temporal</li> <li>• Quantitative through clock time</li> <li>• Qualitative as relative to other smells</li> </ul>	 <p>Image courtesy of Tristi Brownnett ©2018</p>
	Intensity	<ul style="list-style-type: none"> <li>• Detected strength</li> <li>• Qualitative as relative to other smells</li> </ul>	
	Name	<ul style="list-style-type: none"> <li>• Option of either lyrical (associative) or literal (source-based)</li> </ul>	

	Hedonic tone	<ul style="list-style-type: none"> <li>• Individually determined</li> <li>• Like or dislike as binary</li> <li>• Option of scale</li> </ul>	 <p>'Smell', from Allegory of the Senses by Jan Brueghel the Elder in Museo del Prado</p>
	Clarity	<ul style="list-style-type: none"> <li>• Simple and clear or fuzzy and complex</li> <li>• Can also be understood as purity</li> </ul>	
	Texture	<ul style="list-style-type: none"> <li>• Can be soft or harsh e.g.: Cannabis can sting / Violets can caress / B.O. can hit like a smack in the face</li> </ul>	
<i>Interpreted qualities</i>	Colour	<ul style="list-style-type: none"> <li>• Primary reaction to the smell in question</li> <li>• Smell-colour cross-modal links are explored within cognitive science</li> </ul>	

	Shape	<ul style="list-style-type: none"> <li>• Nose-feel</li> <li>• How a smell is experienced upon sniffing – the first physical encounter</li> <li>• Solid or wispy with single or multiple components</li> </ul>	
Associative qualities	Association	<ul style="list-style-type: none"> <li>• Our first encounters affect subsequent association</li> </ul>	
	Memory	<ul style="list-style-type: none"> <li>• Individual and nuanced</li> </ul>	
	Emotion	<ul style="list-style-type: none"> <li>• Smells can evoke strong emotional reactions.</li> <li>• Many of our olfactory likes and dislikes are based on emotional associations.</li> </ul>	

**Table 3.2:** Qualities of smell that might be recorded during a smellwalk as presented in a slide show prior to workshop activity

Table 3.2 indicates some of the qualitative dimensions across which smells might be approached. In using photographs depicting real-life contexts I was able to frame smells as external and ecological, everyday encounters familiar to the European students in the workshops. This deliberate approach distanced the research from the interiority of memory

and association often used by artists as a point of access to the olfactory world.<sup>150</sup> My use of visual metaphor also served to initiate discussion on how sensory translation might be applied. Giving priority to visuals re-focused attention away from the problematic of language, legitimising a qualitative and interpretative understanding. Delivering the workshops enabled me to hone my own choice of data extracts for my case studies.

### 3.4 Structuring the smellscape for sensory communication

After presenting options for structuring and organising the smellscape via taught workshops I decided to downplay the affective memory and emotional qualities of smell, focussing on the qualities listed in Table 3.3.

Smell quality	Explanation	Example / scale used	Interdisciplinary derivation
<i>Name</i>	Quality or character of the smell detected which aids recall. Might be either literal or lyrical	Smell of shattered dreams OR Stale beer on the sidewalk	
<i>Intensity</i>	The perceived strength of an odour when described by a recipient	Seven-point scale: Not perceptible, very weak, weak, distinct, strong, very strong, extremely strong	Qualitative scale within olfactometry as explained in Environmental Protection guidelines <sup>151</sup>
<i>Duration</i>	Perceived length of a smell interaction / exposure	Seven-point scale: Ranging from very short to very long	Environmental monitoring / odour complaint pyramid <sup>152</sup>
<i>Hedonic tone</i>	Pleasantness or unpleasantness of an odour	Seven-point scale: Ranging from dislike intensely through neutral to like intensely	Adapted from environmental science's nine-point scale (ranging from very unpleasant through neutral to very pleasant) <sup>153</sup>

150 See Section 2.1 of this thesis.

151 The Association of German Engineers (VDI), *VDI-Standard: VDI 3882 Blatt 1 Olfactometry; Determination of Odour Intensity* <[https://www.vdi.eu/guidelines/vdi\\_3882\\_blat\\_1-olfaktometrie\\_bestimmung\\_der\\_geruchsintensitaet/](https://www.vdi.eu/guidelines/vdi_3882_blat_1-olfaktometrie_bestimmung_der_geruchsintensitaet/)>; Western Australia and Department of Environmental Protection, *Odour Methodology Guidelines*, 2002.

152 McGinley and Michael A. McGinley, 'Field Odor Monitoring and Enforcement'.

153 Mark Southwood and others, *Odour Guidance for Local Authorities* (DEFRA, March 2010).

<i>Expectation</i>	Whether the smell is expected at this place and time	Yes OR No	Adapted from urban studies where it is explained how smell expectation influences urban place experiences <sup>154</sup>
<i>Personal association / comments</i>	Additional comments on top of the data already recorded	Comment box	Free space for participants to note their thoughts – a key field to facilitate smellsketching (see Ch. 4, page 138)

**Table 3.3:** Attributes of smells included as data fields in a designed smellnote onto which smellwalkers are requested to record smell information during a smellwalk

My rationale for the inclusion of the above was based on enabling new smellwalkers to experience, note and recall the olfactory landscape:

- Name (of a smell) makes connections between smells and sources, smells and the smellwalker, and aids subsequent sharing of information;
- Intensity enables my creation of smell symbols on a visual map (see Chapter Four, Figure 4.9, page 116);
- Duration contributes to the visual rendering of smell, particularly in dimensional sculptural form (see Chapter Four). Both intensity and duration enable post-event comparative smell sketches to be created;
- Hedonic tone enables discussion midway through a smellwalk as to the often negative preconception of the city’s smells against individual perceptions recorded;<sup>155</sup>
- Expectation aids the smellwalker in correlating smell with context;
- Personal association/comments allow smellwalkers to inscribe a more personal understanding of the smells and enables me to appreciate their sniffing thoughts (particularly when I render smellnotes of others as watercolour smell sketches).

154 Neil Bruce and Victoria Henshaw, ‘Smell and Sound Expectation and the Ambiances of English Cities’, in *Ambiances in Action / Ambiances En Acte(S)* (presented at the International Congress on Ambiances, Montreal, Canada: Ambiances Network, 2012), pp. 449–54.

155 When asked in advance, most smellwalk participants rate their urban smellscape with a low hedonic tone, and are surprised to find after the walks that their overall rating is above average. This illuminates how altering primary sensory modality, deliberately sensing nose-first, highlights the positive olfactory smellscape over that witnessed as part of passive smell consumption.



The table indicates how I appropriated olfactory qualities and measurement scales from environmental science and humanities and adapted them so as to elicit qualitative smell perceptions from non-experts. In the next section I deploy reflective writing as a method to identify key aspects from selected smellwalks and indicate how techniques, motivations and outcomes impacted my final smellwalk strategy and structure. In grouping similar types of smellwalk together, my reflections are not necessarily in date order of their occurrence, enabling me to pull out themes and develop a typology of smellwalks.

### 3.5 *Sniffing the world: practicing the smellwalk*

The smellwalk, theorised by Porteous and activated by Henshaw, is a method for collecting smell data. Smellwalking is deliberate; it deploys the nose as an active organ collecting sniffed olfactory information in a specified place regarding smell as an active perceptual system according to Gibson's theorisation.<sup>156</sup> Smell perception is ecological in that any movement on the part of the smellwalker may result in a change of smell detection for themselves and for others. Prior experience enables people to identify smells and affects how they react to them.<sup>157</sup> However, rarely in our ocular-centric everyday existence do we deliberately foreground our sense of smell.<sup>158</sup>

In the following paragraphs I trace the evolution of three variations on the smellwalk; solo, paired, and group. These practices in turn lead to three distinct smellwalking practices which I term: the smellfie, buddy smellwalking and group smellwalking. Each of the smellwalks listed in this chapter can be cross-referenced against the *Smellwalk Log* (Appendix 1).

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156 James Gibson, *The Senses Considered as Perceptual Systems*, New edition (Westport, Conn: Praeger, 1983).

157 Karen B. Schloss and others, 'What's That Smell? An Ecological Approach to Understanding Preferences for Familiar Odors', *Perception*, 44.1 (2015), 23–38.

158 Martin Jay, *Downcast Eyes: The Denigration of Vision in Twentieth-Century French Thought* (Berkeley and Los Angeles, California: University of California Press, 1994).

NORTH AMERICA

EUROPE

ASIA

YWR 103.12° W

104° 00' 00" W

105° 00' 00" W

106° 00' 00" W

04° 25' 00" W

05° 00' 00" W

05° 35' 00" W

06° 10' 00" W

06° 45' 00" W

07° 20' 00" W

07° 55' 00" W

08° 30' 00" W

09° 05' 00" W

09° 40' 00" W

10° 15' 00" W

10° 50' 00" W

11° 25' 00" W

12° 00' 00" W

12° 35' 00" W

13° 10' 00" W

13° 45' 00" W

14° 20' 00" W

14° 55' 00" W

15° 30' 00" W

16° 05' 00" W

16° 40' 00" W

17° 15' 00" W

17° 50' 00" W

18° 25' 00" W

19° 00' 00" W

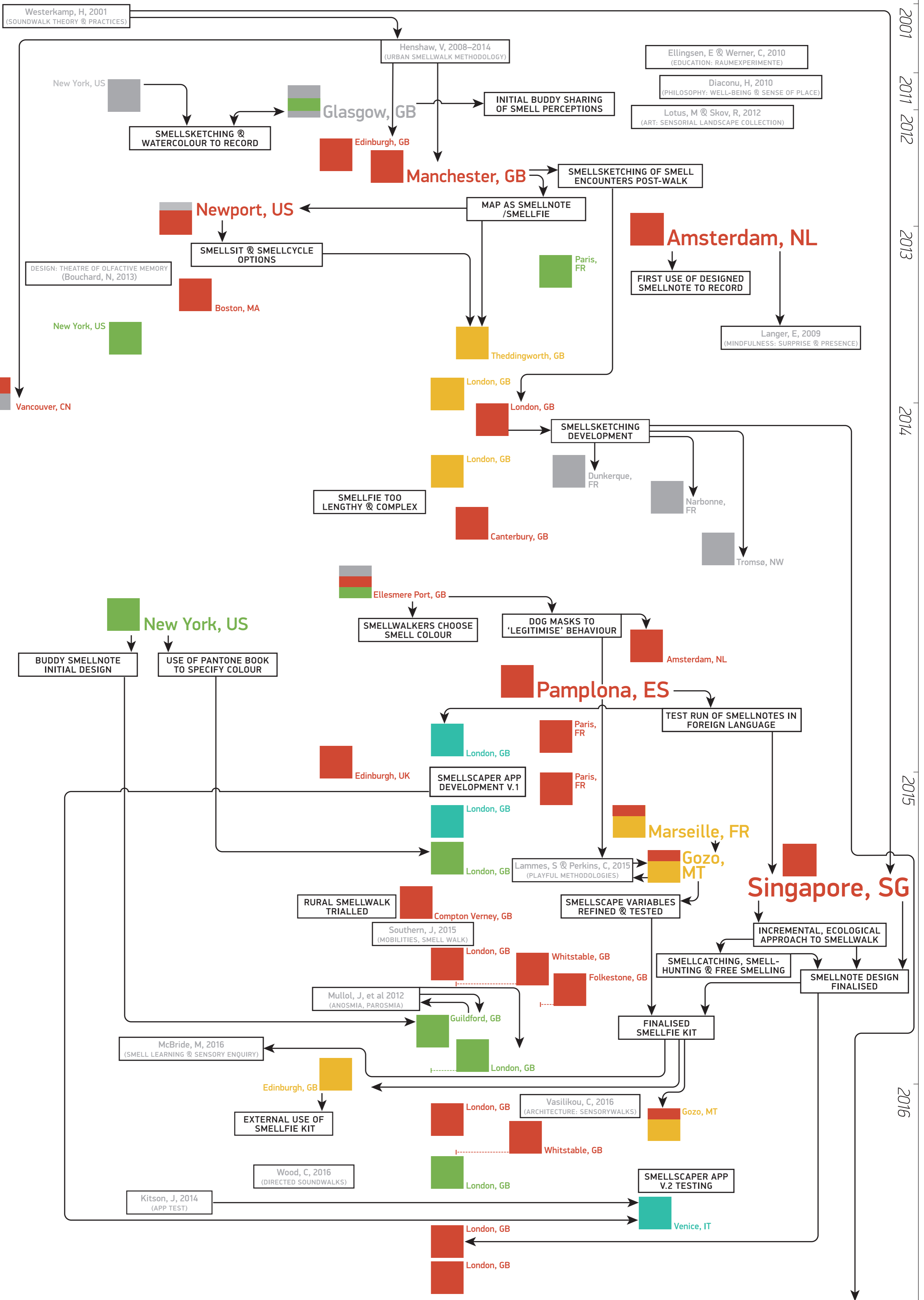
19° 35' 00" W

20° 10' 00" W

20° 45' 00" W

21° 20' 00" W

21° 55' 00" W



Reflective Practice

DEVELOPMENT OF THE

# SMELLWALK

(METHODS AND TOOLS FOR WALKING AND RECORDING EVERYDAY SMELLSCAPES)

2011 – 2016

GROUP WALK

BUDDY WALK

SMELLFIE

APP WALK

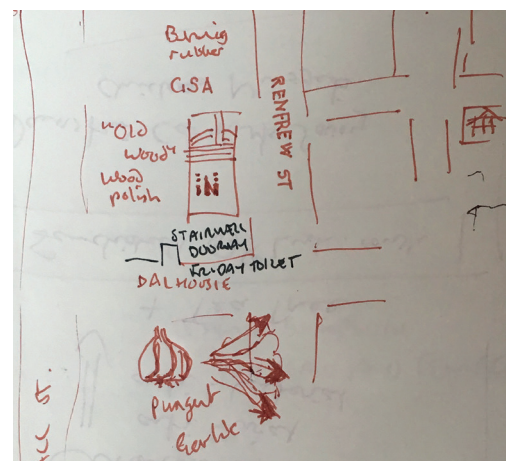
SOLO WALK

SMELLWALKING IS A FORM OF SMELLMAPPING

The log is a detailed record of smellwalk experiences and learning, that I refer to as a research tool when designing new bespoke events. As the smellwalks evolved so did my methods for designing and locating routes, recruiting participants and recording the smells encountered. Figure 3.4, *Development of the Smellwalk*, itemises significant smellwalks undertaken between 2011 and 2016 and their developmental influences.

My first solo smellwalk took place in New York in July 2011 around what had been recently dubbed the city's 'smelliest block'.<sup>159</sup> Manhattan was stiflingly hot. I ambled around two Lower East Side blocks, sniffed the air constantly, inhaling in search of a range of strong scents. Instead I noticed large voids and questioned the absence of smells. In a temperature where I was expecting to be bombarded by aromas I was intrigued to find so much negative olfactory space.<sup>160</sup> Occasional smells punctuated the void, dominating my airspace for 400 milliseconds creating momentary impressions before disappearing.<sup>161</sup> Reverse-walking the route brought new smells into range and simultaneously confirmed location-specific odours.

Early in my practice I smellwalked solo to come to terms with my own understanding of the smellscape, and to experiment with visual representation. Recording my findings as written descriptors on a sketchmap (Figure 3.5) revealed smell source locations in relation to one another.



**Figure 3.5:** Recording the placement of smell detections on smell sketchmap (2011). West End, Glasgow

159 Kate McLean, 'Eca Student: Week 97 - The Smelliest Block', 2011 <<http://ecastudent.blogspot.com/2011/07/week-97-smelliest-block.html>> [accessed 11 March 2016]; Molly Young, 'The Smelliest Block in New York', *NYMag.Com*, 2011 <<http://nymag.com/guides/summer/2011/smelliest-block/>> [accessed 21 January 2014].

160 Emily Sohn, 'Why Cold Air Smells Different', *DNews* <<http://news.discovery.com/human/life/why-cold-air-smells-differently-140114.htm>> [accessed 30 September 2015].

161 Piet Vroon, *The Secret Seducer Smell* (New York: Farrar, Straus and Giroux Inc, 1997).

Recording smells through coloured illustrations (Figure 3.6) contributed a more holistic olfactory picture which I found to be helpful when remediating my olfactory findings to others. In attributing colours to individual smell experiences, I discovered the smellwalk to have a place-specific identity of its own as well as indicating the variety of individual composite smells therein.



**Figure 3.6:** Smellsketch primary field research (2011). Barras Market, Glasgow

In 2014 in northern France, I encountered a single sniff of a complex smell. The words I used to describe it, 'metallic, savoury ocean' were reductive and insufficient, and so I painted the experience in favour of illustrating the source (Figure 3.7). Describing the smell later, I discovered my personal recollection of the odour was more vivid with the accompanying visual. Over subsequent months I painted my olfactory experiences for an hour at a time in various cities learning how to attribute colours, shapes and direction to the physicality of inhaling and responding to a smell.<sup>162</sup>



**Figure 3.7:** Les odeurs de Dunkerque (2014) Smellsketches I created in-situ to document experience of smelling to add to the descriptions, early investigations into colour and form as a method of documenting the smellscape. I selected watercolour as the medium because of how the suspended pigment particles (in water) resembled the distribution of smell molecules in air

162 Kate McLean, 'City Smell Sketches', 2014 <<http://sensorymaps.blogspot.com/2014/06/city-smell-sketches.html>> [accessed 29 March 2016].

The paired smellwalk came about in 2012 as a result of media interest in smellmapping. As The Herald senior features writer Teddy Jamieson accompanied me along Trongate Alley in Glasgow, he mentioned how omnipresent fatty smells from fast food outlets lingered in the dreich.<sup>163</sup> His local knowledge affected my smell symbol design and also raised the question in my mind as to whose detections should initiate the smellmappings. A subsequent smellwalk with a Glaswegian friend further developed my appreciation of having a local perspective. As she explained the local importance of wearing perfume when shopping on Buchanan Street, and the tradition of drinking Bovril at seasonal football games I came to understand how important context is to smell. Similarly, during a ride with Glasgow's coastguards on the River Clyde patrol boat I heard local tales of the water's redolence. Conversations during the ride touched on how the mud harbours the river's smell, how dead pigs are used to train sniffer dogs seeking drowned corpses, how reduced quantities of toxic and smelly paper mill effluent is resulting in returning fish populations, the smell of the sewer fatbergs.<sup>164</sup>

In 2013, following on from successful smell walking and talking in Glasgow, I invited a native New Yorker to accompany me on a Greenwich Village smellwalk.<sup>165</sup> Sniffing side-by-side, I recorded our agreed wording for smells captured at the doorways and windows of one block. I subsequently reverse-walked the route solo creating two mappings (Figure 3.8). This paired walk reinforced my commitment to working with local populations to afford greater insight into the smellscape. Not only did my smell buddy indicate indigenous plants, religious customs and food dishes, but she also

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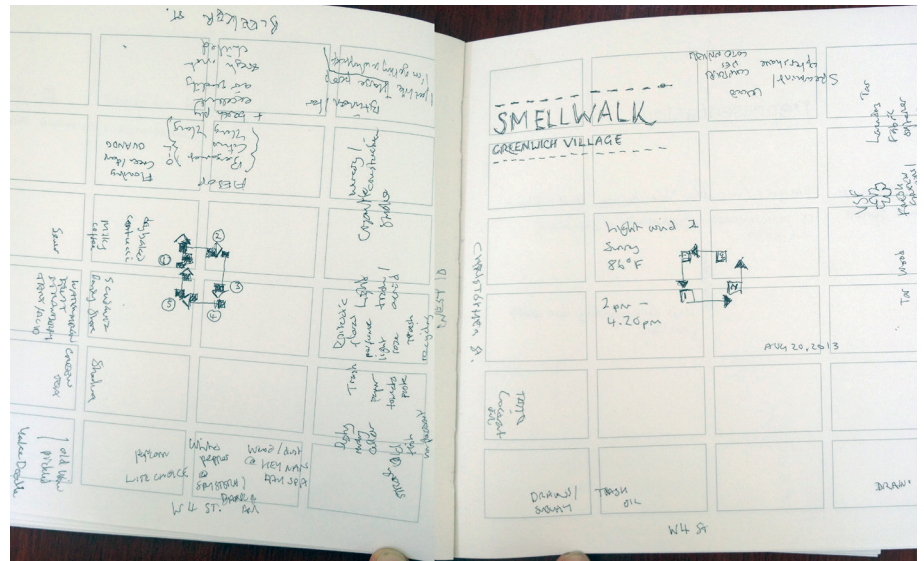
163 Michael Kuehn and others, 'Changes of Pressure and Humidity Affect Olfactory Function', *European Archives of Oto-Rhino-Laryngology: Official Journal of the European Federation of Oto-Rhino-Laryngological Societies (EUFOS): Affiliated with the German Society for Oto-Rhino-Laryngology – Head and Neck Surgery*, 265.3 (2008), 299–302.

164 Teddy Jamieson, 'Scents & Sensibility', *Herald Scotland*, 12 June 2012 <[http://www.heraldscotland.com/arts\\_ents/visual/13061337.Scents\\_\\_\\_sensibility/](http://www.heraldscotland.com/arts_ents/visual/13061337.Scents___sensibility/)> [accessed 25 March 2016].

165 Kate McLean, 'Smellwalking: Threshold Smells of Greenwich Village, NYC', 2013 <<http://sensorymaps.blogspot.com/2013/08/smellwalking-threshold-smells-of.html>> [accessed 11 March 2016].

indicated where smell encounters might take place. A situated exchange of olfactory information became invaluable to my practice of mapping everyday, contingent smellscape.<sup>166</sup>

**Figure 3.8:** Left page: agreed smells and their sources. Right page: reverse direction smell confirmations (2013). Greenwich Village, NYC



Group smellwalking was an activity I encountered early in my practice. In December 2011 I attended the Sensory Worlds conference as an artwork exhibitor. Dr Victoria Henshaw, also a conference delegate, suggested we design and lead a smellwalk to apprehend some of the city's odours in-situ.<sup>167</sup> Henshaw's research, in urban planning and development, directed the smellwalkers' attention to the effects of legislation on the olfactory environment with regard to stale cigarette odours whereas my city artwork drew attention to location-specific odours of chip fat, penguins and cherry blossom.<sup>168</sup> Henshaw advised we walk in silence, as practiced in structured soundwalks, enabling smellwalkers to concentrate on an unfamiliar activity.<sup>169</sup>

166 Donna Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective', *Feminist Studies*, 14.3 (1988), 575–99.

167 University of Edinburgh, 'Sensory Worlds: Environment, Value and the Multi-Sensory | IASH', 2011 <<https://www.iash.ed.ac.uk/sensory-worlds-environment-value-and-multi-sensory/>> [accessed 16 January 2018].

168 Kate McLean, 'Smellmap: Edinburgh | Sensory Maps', 2011 <<http://sensorymaps.com/portfolio/smell-map-edinburgh/>> [accessed 6 March 2018].

169 John L. Drever, 'Silent Soundwalking: An Urban Pedestrian Soundscape Methodology' (presented at the AIA-DAGA 2013, the joint Conference on Acoustics, European Acoustics Association Euroregio, 39th annual congress of the Deutsche Gesellschaft für Akustik and the 40th annual congress of the Associazione Italiana di Acustica, Merano: AIA-DAGA, 2013).

In 2012 I attempted to apply the silent group smellwalk method with participants in Newport RI, and failed. The bespoke route map I designed (Figure 3.9) proved problematic when it came to recording smells and the group became disenchanted with the lack of structure and parameters and lost interest. As a result of this experience I decided to limit the size of group smellwalks to between eight and twelve people, to separate navigation from smell-recording and provide greater guidance.

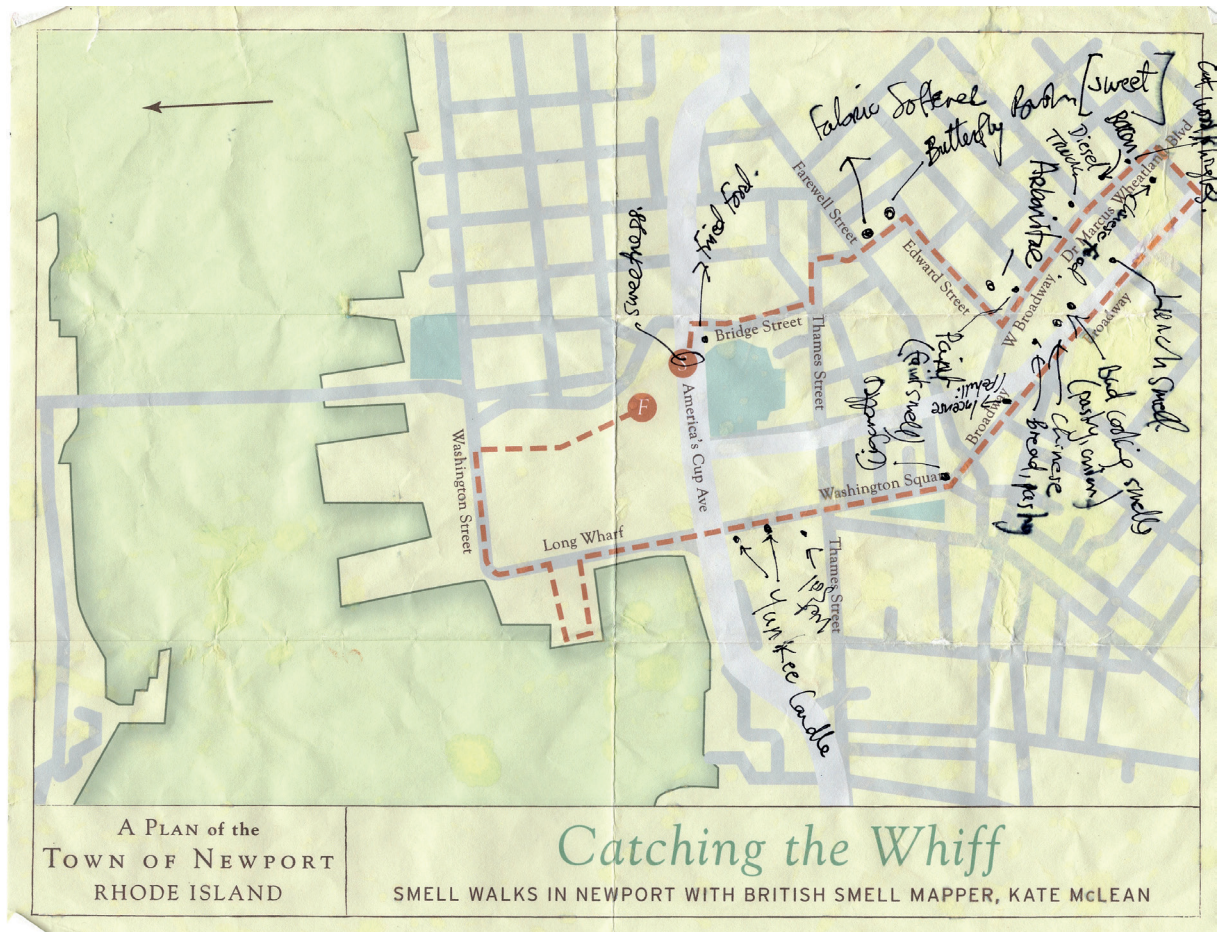


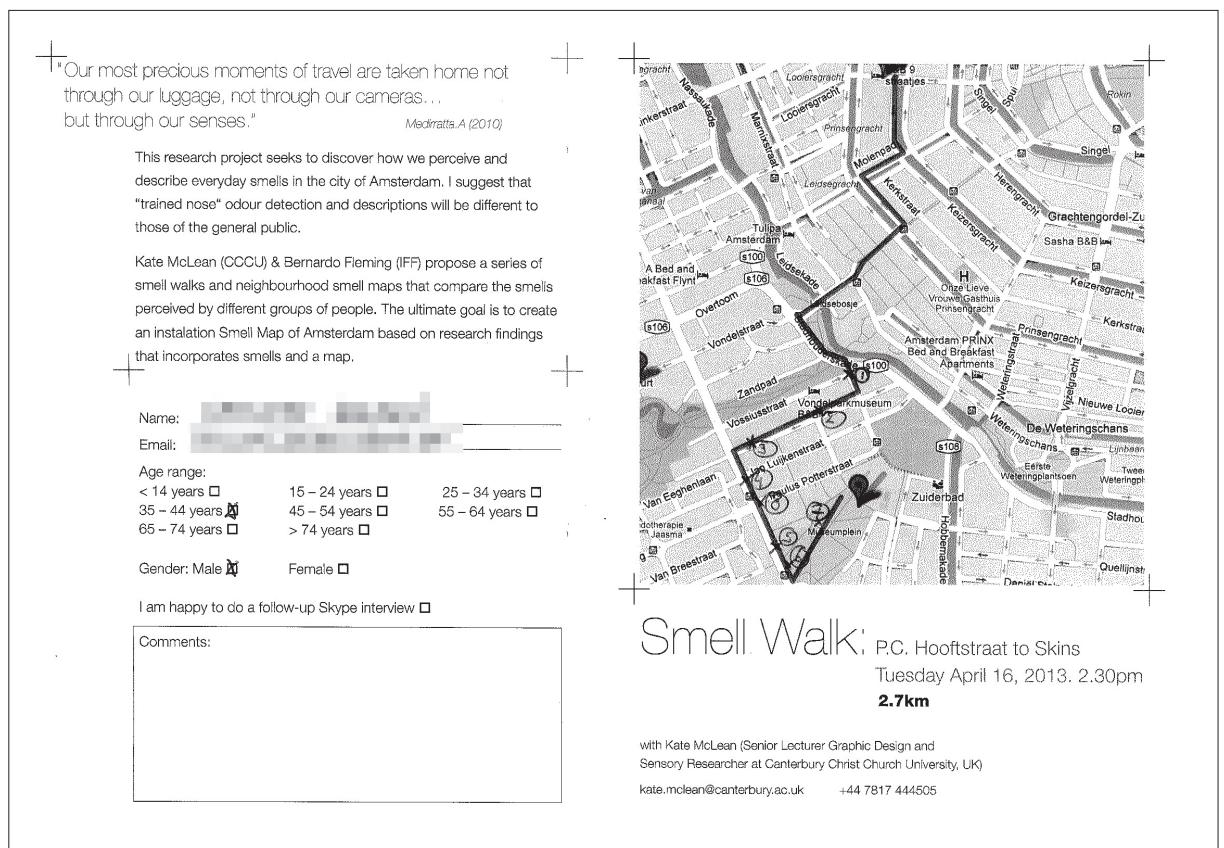
Figure 3.9: Difficulties in recording smells on a bespoke-designed route map (2012). Newport, RI, USA

In 2013 I constrained the timeframe of the project and individual smellwalks, increased the number of participants, extended the geographical coverage of the smellwalks and allocated a week to undertake primary research. I designed a series of nine smellwalk routes between 1km and 2.7km in length based on tourist cards, the 'City Walks



Deck: Amsterdam'.<sup>170</sup> With assistance from the Olfactive Design Studio at International Flavors and Fragrance (IFF) and through social media, I recruited forty-nine smellwalkers for a series of eleven walks over four days.

Learning from previous smellwalks, I created route maps in advance (Figure 3.10) and added a separate data collection table (Figure 3.11) with six fields to structure recording of smells: smell number (location marked on route map), description, odour intensity, expectation, association and hedonic rating. I called these tables 'smellnotes'. Of these fields only three were of direct relevance to my visual mapping (location, description and intensity), the remaining fields offered the smellwalkers an opportunity to contextualise their experience.



**Figure 3.10:** Smellnotes booklet pp. 1 & 4 indicating route map and smellwalker indications as to smell locations (2013). Amsterdam, NL

170 Amelia Thomas and Bart Wright, *City Walks Deck: Amsterdam* (San Francisco, CA: Chronicle Books, 2006).

# Smell Map

Amsterdam  
SPRING 2013

Oudour Intensity						
0	1	2	3	4	5	6
no odor	very weak	weak	distinct	strong	v. strong	intolerable

Smell # (locate on map)	Description	Oudour Intensity (0 - 6)	Expected smell? Y/N	How does it make you feel? Please describe any immediate memories or associations you have with this smell.	Smell rating (1 - 5) 1 = Dislike 5 = Like
1.	Fresh paint, solvent	3	N	Home improvement	2
2.	Entrance of Jans Aup. leather	2	Y	Soft leather, new shoes, first day of school	4
3.	*Fierce (Abnambie & Fitch)	4	N	New York, 5th Ave, Entrance of the A&F flagship.	5
4.	Bakery	4	Y	Comforting, familiar smell	5
5.	different kinds of tulips	3	Y	orange tulips: spicy, soft, curry-like red tulips: from perfume-like: lavender garden	5
6.	Red tulips	4	Y	Sweet rose, honey-like - cosmetic cream	5
7.	Dry grass, hay-like	3	Y	Countryside, holidays, sun	5
8.	Fried/Rotten onions	5	N	garbage, waste disposal	1
9.					
10.					
11.					
12.					
13.					
14.					

Figure 3.11: Smellnotes booklet pp. 2 & 3 datafields and participant data entries (2013). Amsterdam, NL

On the first of the Amsterdam smellwalks a smellwalker asked whether he should seek out smells or just note them when he noticed them and my advice, to “simply receive”, resulted in minimal smell notes after forty-five minutes and nothing at all from one potentially fragrant location; Amsterdam’s last remaining gin distillery. From that moment on I encouraged all smellwalkers to both actively seek proximal smells (Figure 3.12) and receive long-distance smells; those which are more affected by weather conditions and seasonal activity.<sup>171</sup> Later this differentiation became the scaffolding of a tripartite structure of the smellwalk, moving from distal and received smells to activated and proximal smells.

171 Henshaw, *Urban Smellscapes*.



**Figure 3.12:** Smellwalkers actively engaged in seeking proximal smells (2013). Amsterdam, Netherlands

In October 2014 I undertook a commissioned smellmapping in Pamplona, working almost entirely through translators. Through the absence of a common language the embodied nature of smelling emerged; we shared smell experiences, pulling faces and communicating non-verbally to indicate sources and hedonic tone. Smellwalkers sought smells in road drains, keyholes, bushes, and along park benches revealing the smellwalk to be a physically active practice, involving the whole body in stooping, bending and stretching (Figure 3.13) in search of possible smells.



**Figure 3.13:** Smellhunting, an active and embodied process, on a bench (2014). Pamplona, Spain. Image courtesy of Victoria Lydford

For group smellwalks I recognised the need for a structure in order to maintain focus; it was naïve and optimistic to expect that smellwalkers would be invested in the process for the benefit of my research. The Newport walk in particular had felt chaotic. Henshaw's phasing of a smellwalk with stopping points offered a useful model in that it enabled:<sup>172</sup>

- breaks from actively smellwalking as a chance to reflect on, and share, perceptions;
- a chance for smellwalkers a chance to stop concentrating and rest from an unusual activity;
- me, as walk leader, to make use of the pauses to provide additional walk-specific information, for example how to reset the nose (sniffing your own skin is more effective than the well-known myth of using coffee beans)<sup>173</sup> and how adaptation affects us (olfactory receptors tire and have a reduced ability to detect an odour following initial exposure).<sup>174</sup>

As advocated by Henshaw walking smellwalk routes in advance became an essential part of my practice.<sup>175</sup> I ensure the distance is less than 1 km and can be completed in the maximum of one hour. This decelerated pace focuses some walkers on seeing the familiar in a completely new way, discovering places that they ignored when walking at commuter pace.

With experience I came to realise how legibility of the route map could be improved with the contrast between a monochrome base map, a heavier line to indicate the route, and the use of colour to show the three smellwalk stages. I now laser print smellnote design (Figures 3.14 and 3.15) onto a 300gsm card stock to facilitate writing when walking.

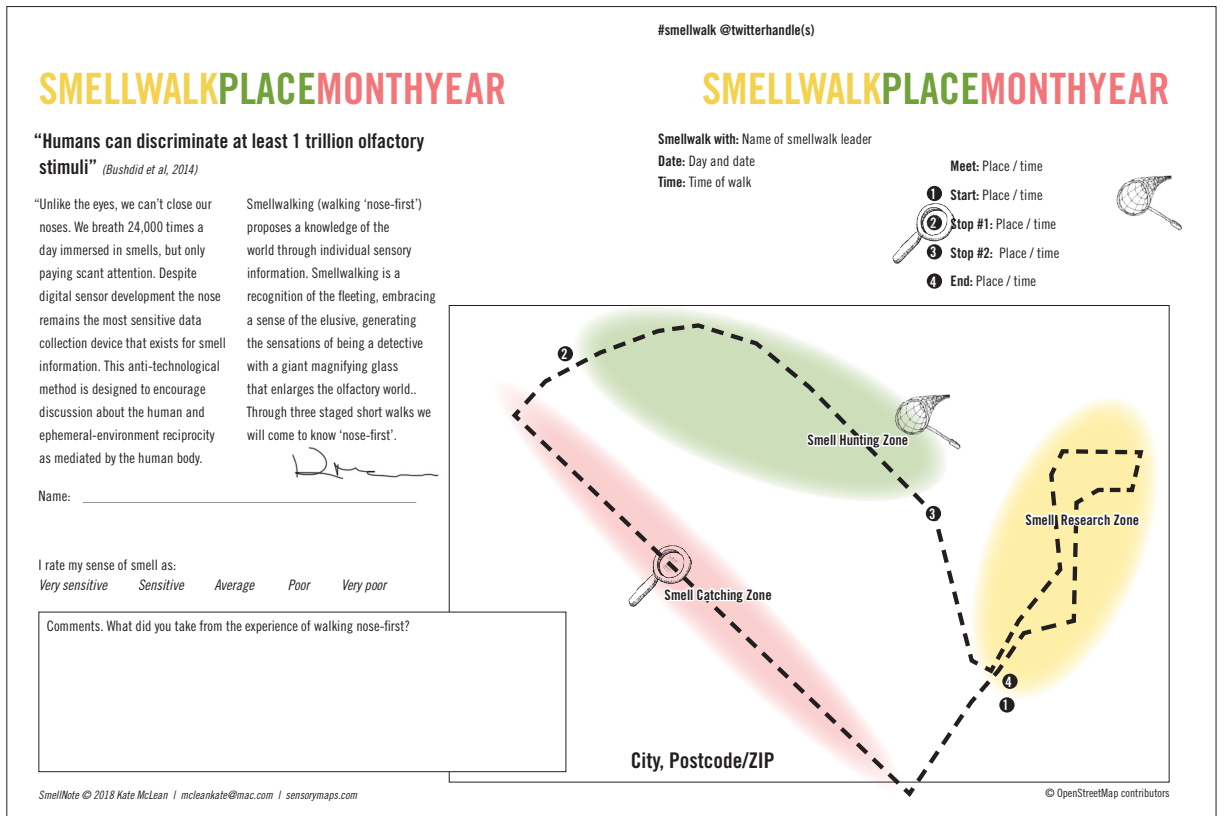
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172 Henshaw, 'Route Planning a Sensory Walk: Sniffing Out the Issues'.

173 Avery Gilbert, *What the Nose Knows: The Science of Scent in Everyday Life* (New York: Crown Publishing Group, Division of Random House Inc, 2008).

174 Trygg Engen, *Odor Sensation and Memory* (New York: Greenwood Publishing Group, 1991).

175 Henshaw, 'Route Planning a Sensory Walk: Sniffing Out the Issues'.



**Figure 3.14:** Smellnote Cover (2018). Generic design for a smellnote. A4 in size prints recto-verso with the recording table (Figure 3.15). Folded to create an A5 booklet. Under the route and smell zones on the front cover the terrain covered is taken from (and credited to) OpenStreetMap and modified to grey scale before being inserted into the rectangle on the front cover

#smellwalk @twitterhandle(s)

# SMELLWALKPLACEMONTHYEAR

Smell no. (pinpoint the smell number on the map)	Name of smell	Smell intensity		Smell duration		Smell like/dislike		Expected smell?		Comments & thoughts
		(weak)	(strong)	(short)	(long)	(dislike)	(like)	(yes)	(no)	
1.	Smell Catching (airborne smells, distant, )	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
2.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
3.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
4.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
5.	Smell Hunting (interesting smell sources, close-up)	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
6.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
7.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
8.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
9.	Smell research (your choice of 4 linked smell experiences)	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
10.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
11.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
12.		●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	
13.	Summary smell (pick one smell from today's experience)	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●●●●●●	●	●	

SmellNote © 2018 Kate McLean

**Figure 3.15:** Smellnote Table (2018). Generic design for a smellnote. A4 in size prints recto-verso with cover (Figure 3.14) and folded to create an A5 booklet

### 3.6 *Group smellwalking: a method*

The group smellwalk embraces the complexity of everyday smellscapes, enabling their constituent, ephemeral smells to be determined. In practice, the smellwalk also serves as a performative mapping whereby participants are 'a part of the map, as opposed to being its subject'.<sup>176</sup> Thus, the smellwalk leader has a facilitation role whereby individual journeys of olfactory discovery and observations, are balanced against data collection.

My version of the smellwalk is a designed event which engages non-specialists in smell encounters and collects qualitative smell perceptions. It is premised on an ethos in which opportunities for smell experience derive partly from participants' curiosity and partly from possibilities afforded by the choice of route. I encourage participants to interrupt the flow of a smellwalk's planned trajectory, to follow their own noses as they explore, calling to one another to share smell encounters. Diversions are built into the length and timing of the walk's three sections, as indicated previously.

My recommendation, based on the experiences detailed above, results in a staged walk with increasing immersion into the world of smell through a tripartite structure as indicated in Table 3.4. The incremental stages of immersion serve as a sensory shift from 'eyes-first' to 'nose-first' and take into account distant and proximal smell detection strategies, culminating in independent, olfactory-environmental engagement. The smellwalk can be introduced as a playful challenge; a pragmatic acknowledgement that some people are happier to engage in sniffing in public than others, and of people's belief in their inability to smell anything at all. Despite being surrounded by smells, Western populations do not trust their ability to name odours.<sup>177</sup> The method instils confidence in the walker by pointing out the legitimacy of their concerns and to suggest

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176 Perkins, p. 129.

177 Elizabeth Landau, 'English Speakers, You Stink at Identifying Smells', *New Scientist*, 2015 <<https://www.newscientist.com/article/mg22530140.300-english-speakers-you-stink-at-identifying-smells/>> [accessed 30 March 2015].

strategies to overcome them, such as looking for a smell's source or using lyrical descriptions. My findings also suggest that relating anecdotes from previous smellwalks alleviates new participants' concerns.

Time allocation within an hour-long smellwalk	Stage	Activity
00:00:00 – 00:05:00	Introduction	<ul style="list-style-type: none"> <li>• Explain rationale and/or commissioning body</li> <li>• Invite participants to introduce themselves and state their interests in taking part</li> <li>• Explain smellscape mapping practice and request signing of ethics forms</li> </ul>
00:05:00 – 00:10:00	Smellscape theory and practical considerations (delivered by leader)	<ul style="list-style-type: none"> <li>• Derivation and conceptual understanding of the term smellscape, its spatial components and temporal elements</li> <li>• Structure of smellwalk as three successive stages of immersion into the olfactory landscape</li> <li>• Introduce alternative sensory foregrounding; re-ordering primary sensory input from visual to olfactory by decommissioning the eyes to become purely functional tools for navigating any hazards</li> <li>• Example of smell description language: lyrical (and affective) to the literal (source) with an example from NYC 2014 in which one smellwalkers 'beer-sticky sidewalk outside a bar' was another's 'smell of shattered dreams'. Or as one smellwalker explained after the experience; "I don't necessarily smell what you smell"<sup>178</sup></li> <li>• (This new information reframes participants' assumptions and existing city knowledge)</li> </ul>
00:10:00 – 00:20:00	Stage 1: Smell catching	<ul style="list-style-type: none"> <li>• Smell catching serves to reawaken participants to the existence of smells as volatile molecules in the air</li> <li>• Emphasis is placed on noticing distant, airborne smells when walking. These smells are likely to have travelled, to be ephemeral and subtle, leaving the smellwalker keenly looking around for a potential smell source</li> <li>• Detection rates can be doubled over ordinary breathing through deep sniffing which necessitates drawing in deeper breaths than normal and paying attention to what is inhaled. Recommendation is to breath slowly and inhale as smells cross the nose... I employ a metaphor of the butterfly catcher lunging after elusive, flying insects</li> <li>• Everyone notices something. Participants are asked to write information about four smells on their smellnote forms – many notice far more.</li> </ul>

178 Julie Hecht, 'Put Your Nose First: Smellwalks for You and Your Dog', 2014 <<http://blogs.scientificamerican.com/dog-spies/put-your-nose-first-smellwalks-for-you-and-your-dog/>> [accessed 8 July 2015].

00:20:00 – 00:30:00	Sniff break	<ul style="list-style-type: none"> <li>• Facilitated discussion in which participants read from their smellnotes</li> <li>• Mention smell adaptation and habituation and their respective differences</li> <li>• Explain a multi-sensory strategy to detect close-up smells; smell hunting</li> </ul>
00:25:00 – 00:35:00	Stage 2: Smell hunting	<ul style="list-style-type: none"> <li>• Emphasis is placed on using a multi-sensory approach to select potentially interesting smell sources</li> <li>• Eyes might detect a pile of books, ears hear a motor running, hands might crush a leaf or scratch at brickwork, tongue crave a coffee or eat some herbs</li> <li>• In exploring in this way, the body bends to discover the possibility of objects as sources of smell. Getting the human nose close to the material built environment and nature encourages proximal smelling</li> </ul>
00:35:00 – 00:45:00	Sniff break	<ul style="list-style-type: none"> <li>• Facilitated discussion in which participants read from their smellnotes</li> <li>• Comparison between sensory difference where plants might all be similar in colour but register completely different smells. Consideration as to which of their senses participants are more likely to trust</li> <li>• Explain how they are ready for the next stage; free smelling / smell research</li> </ul>
00:45:00 – 00:55:00	Stage 3: Free smelling / smell research	<ul style="list-style-type: none"> <li>• Emphasis is placed on individual curiosity. Participants directed to wander away from the group, explore at will, and return with their personal research findings.</li> <li>• Examples include: comparative studies (bins, passers-by, car wing mirrors), deeper experience of a singular smell (smoke), ambiance and place (study of streets and courtyards), and the relative intensities of smells (ignoring any attempt at identification)</li> </ul>
00:55:00 – 01:00:00	Final discussion	<ul style="list-style-type: none"> <li>• Focus on the themes selected for Stage 3</li> <li>• Group might reform to visualise their smell experiences or disperse</li> <li>• Smellnotes collected if required for subsequent smellmapping</li> </ul>

**Table 3.4:** Suggested tripartite structure of activities with examples (and indicative timing) for an hour-long smellwalk

Table 3.4 demonstrates how the leader's input to a group smellwalk can cover background smellscape theory, strategies for experiencing both distant and proximal smells, techniques for releasing local smells from objects, and likely sites of smell encounter. I choose not to blindfold smellwalkers, sometimes suggested as a way to increase alternate sensory awareness, since the purpose of the smellwalk is to detect and collect odours; a process aided by information gained through the other senses.



### 3.7 *A typology of smellwalks*

From my own early walks I witnessed a constant flux of smells and came to recognise the complexity of a qualitative empirical smell world that resisted verification and classification.<sup>179</sup> As my practices evolved so each experience influenced subsequent walks; techniques, conversations, smellnote design, data fields, group organisation, walking strategies, and immersion all emerged from iterative practice as seen in Figure 3.4. Further detail can be cross-referenced against the full listing of walks (Appendix 1). In order to disseminate smellwalking practices more widely I developed some variations. The following section briefly discusses the contexts, aims, development and findings of the ‘smellfie’ and ‘buddy smellwalking’. One additional method, using a bespoke app as a route map and smell-recording device, is covered in greater depth in Chapter Six.

My art/design practice transitioned from an auto-ethnographic exploration of how urban smells might be recorded and depicted visually into a means of sharing olfactory sites, experiences and perceptions to become embodied performative mapping.<sup>180</sup> After leading over one hundred smellwalks, two distinct genres of smellwalk emerged; designer-led and self-guided (smellfie), and three approaches; solo, group, buddy.<sup>181</sup> All are united in their capacity to engage ordinary people in discovery of urban smellscape. With each new smellwalk I empirically tested planning practicalities (distance, time, choice of routes, group sizes, transport options, starts, finishes), facilitation (smellwalk history, participant interactions, expectations, sniffing strategies, smell-specific myths and scientific studies), communication (route maps, recording methods) and leadership (pedagogy, atmosphere, leader knowledge). This led me to propose the following types of smellwalk:

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179 Vroon.

180 Perkins.

181 It is worth noting that the term ‘smellwalk’ is loose and can involve boat trips or cycle rides, the only imperative being that the head and the body should be outside and unrestrained, thus eliminating the car.

- The solo smellwalk is a method by which individuals immerse themselves in the olfactory landscape of an unfamiliar environment. Notetaking and smellsketching are optional recording methods. This type of walk is designed for immersive familiarization in the smells of a city;
- Group smellwalking is an efficient way to cover ground when collecting datasets of smell perceptions of a specific place. Any sharing of smell information is dependent on the facilitator allocating time(s) within the walks for conversations and facilitating discussion. Group sizes of under twelve people make smell sharing easier to manage. Group smellwalking may involve the use of bicycles or boats as long as the experience is conducted in the open air;
- Buddy smellwalks come into their own when enabling the sharing smell perception for groups of over twelve people, for those suffering smell loss, and in environments where the focus is on the transmission of situated and embodied smell knowledge. I developed it as an inclusive strategy for larger groups (as my experience hitherto indicated smellwalks with more than twelve people left some participants feeling excluded from group conversations). I paired the participants as smell buddies and re-designed the walk to have eight stopping points to promote regular discussion. Partners of anosmics (people unable to smell) frequently take on the role of nose-by-proxy and I was invited by FifthSense, a UK charity providing support to those with smell disorders to lead a smellwalk indicating how anosmics and their normosmic partners might engage in open discussions about smell and share respective experiences.<sup>182</sup> Discussion during the walk revealed how many who have experienced olfactory loss retain diminishing olfactory memories.

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182 FifthSense, 'Fifth Sense – The Charity for People Affected by Smell and Taste Disorders', 2015 <<http://www.fifthsense.org.uk/>> [accessed 12 March 2016]; Annika Brämerson and others, 'Prevalence of Olfactory Dysfunction: The Skövde Population-Based Study', *The Laryngoscope*, 114.4 (2004), 733–37.

- The 'smellfie' is a set of instructions; background information and guidance inviting independent investigation on the part of the smellwalker. It is a free set of resources available from my web site and has been requested by academics, teachers and artists.<sup>183</sup> It contains a digital slide presentation with photos of embodied sniffing in public places, smellscape theory, suggested smellwalk structure and a generic smellnote recording table. Formal requests and uses of the kit are indicated in Table 3.5.

Date	Request from	Discipline	Why smellfie was requested / given	Evidence
Jul 2016	Carleton University, Canada	Industrial Design	Teaching materials for second year undergraduates	Email <sup>184</sup>
Nov 2016	Rowan University	Geography and the Environment	Enviro/sustainable planning course – teaching materials	Email <sup>185</sup>
Apr 2017	New York City Department of Transportation Summer Streets Program	Public Art Commission for	To collect data for Smell Mapping Astor Place <sup>186</sup>	Vimeo <sup>187</sup>
Jul 2017	University of Guelph	Art commission	To collect data for Smell Mapping of Toronto <sup>188</sup>	Email <sup>189</sup>

183 Kate McLean, 'Smellwalk\_Intro\_Kit', 2015 <[http://sensorymaps.com/wordpress/wp-content/uploads/2015/10/Smellwalk\\_Intro\\_Kit\\_%C2%A9KateMcLean\\_2015.pdf](http://sensorymaps.com/wordpress/wp-content/uploads/2015/10/Smellwalk_Intro_Kit_%C2%A9KateMcLean_2015.pdf)> [accessed 26 March 2016].

184 Lois Frankel, 'DRS 2016 Sensory Workshops', 8 July 2016.

185 Jen Kitson, 'NJ Smell Studio', 31 January 2017.

186 Kate McLean, *NYC Smell Mapping Astor Place*, July 2017 <<http://sensorymaps.com/portfolio/summer-streets-smellmapping-astor-place-nyc/>>.

187 Kate McLean, *Summer Streets 2017 Part 1*, Smellwalking NYCDOT <<https://vimeo.com/smellmap/summerstreets1>>; Kate McLean, *Summer Streets 2017 Part 2*, Smellwalking NYCDOT <<https://vimeo.com/smellmap/summerstreets2>>; Kate McLean, *Summer Streets 2017 Part 3*, Smellwalking NYCDOT <<https://vimeo.com/smellmap/summerstreets3>>; Kate McLean, *Summer Streets 2017 Part 4*, Smellwalking NYCDOT <<https://vimeo.com/smellmap/summerstreets4>>.

188 Diane Borsato, 'Smell Map of Toronto', 12 April 2017.

189 Diane Borsato, 'Map', 5 July 2017.

Aug 2017	Somerset House, UK	Learning and Events programmer for 'Perfume. A Sensory Journey Through Contemporary Scents' exhibition	Late night participatory activity. For this event I combined the smellfie and the smellwalk structure into a series of 3 instructional videos	Email <sup>190</sup> Vimeo <sup>191</sup> Vimeo <sup>192</sup> Vimeo <sup>193</sup>
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**Table 3.5:** Evidence of smellfie kit remote use indicating a range of disciplines and projects from 2016–2017

The above table indicates how requests for the smellfie kit mainly emanate from educators, suggesting their willingness to experiment with new forms of knowledge creation. Email feedback indicated that the smellfie was useful to engage students in detecting sensory environments, as it instigated discussion. As such its strengths lie in its gradual, practical and physical immersion into olfactory encounters through walking.

Both group and buddy smellwalks require advance planning with a caveat that the underlying philosophy (that they remain open to modification by the participants who might change the route based on an interesting smell discovery, or shorten the length as a result of insufficient time) is paramount. Smellwalker observations can become data for physical mappings whereby physical knowledge is transformed by design into visual representation. Thus, smells can be mapped at any given moment for a designated period of time.

190 Sophie Greenstreet, 'Somerset House Events Proposal', 7 July 2017.

191 Kate McLean, *Somerset House Smellwalk 1 of 3*, 2018 <<https://vimeo.com/269238939>> [accessed 14 May 2018]. Password: smellcatching

192 Kate McLean, *Somerset House Smellwalk 2 of 3*, 2018 <<https://vimeo.com/269360535>> [accessed 14 May 2018]. Password: smellhunting

193 Kate McLean, *Somerset House Smellwalk 3 of 3*, 2018 <<https://vimeo.com/269380334>> [accessed 14 May 2018]. Password: freesmelling

### 3.8 *From smellwalking to smellscape mapping*

In this chapter I have explained the methods used to collect data to investigate the secondary research question:

#### **How might the smellscape be conceived as a spatial and temporal environment?**

I have indicated how I combined RTD, rhythmanalysis, smellwalking and agentic and performative mapping practices to form a framework to answer this question. I explained the evolution of my approaches to the smellwalk through a series of reflections in, and on, action tracing how the practices of solo and group smellwalking evolved.<sup>194</sup> I also touched on ‘smellfie’ and ‘buddy’ smellwalks as alternative, inclusive strategies that might be adapted to suit specific needs and requests. During the trial walks, my approach was systematic, situated and active as befits Findeli’s requirement of research-through-design while remaining adaptable to each situation; the country, the people and the rationale behind the walk.<sup>195</sup> By indicating the key moments of smellwalking practice development, my work highlights the benefits of combining distal and proximal smelling in the smellwalk. I have shown how communicating the smellscape is performed along the course of a smellwalk through discussion, moments of reflection and physical instances of individual and shared sniffing.

In addition to a method for data capture my work draws attention to how exploratory and shared aspects of smellwalking highlight lesser, contested, subtle, evanescent and invisible odours, ensuring that the ephemeral smells of urban neighbourhoods do not pass unnoticed. My design of the smellwalk enables participants to undergo a transformative experience whereby they perceive a commonly-known landscape through a neglected sense, rendering their experience distinctive from other walk

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194 Donald A. Schon, *The Reflective Practitioner: How Professionals Think in Action* (Aldershot: Ashgate, 1991).

195 Findeli.

experiences. This heuristic process means each smellwalker generates an individual smellmap, and smellwalking is itself a form of smellmapping.

Smellwalking directs participant attention to presence; slowing the pace of encounter with the city, revealing hidden physical places, human biases, cultural beliefs, aesthetics, architectures and simultaneously highlighting Western language's inability to completely communicate the experience. The smellwalk reveals more smells that normally capture our attention and the process calls attention to individual olfactory nuance. The following two case studies in Chapters Four and Five illustrate in detail the unique qualities and characteristics of two distinct urban smellscales.

Chapter Four | Case Study 1, Singapore

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Practices of  
scentscape  
representation:  
dimensional  
spatialities

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In Chapter Two I defined the smellscape, examining the motivations, outcomes and limitations of previous smellmapping projects. In Chapter Three I outlined the methods by which research questions might be answered, focussing on the nature and structure of the smellwalk. My version of the smellwalk is temporal; walkers ambulate as smells volatilise. But smells are equally connected to the location in which they are perceived, and, as Classen et al suggest, 'Just as odours exist in time and change in time, so do they exist and change within space'.<sup>196</sup>

This chapter considers how the spatial qualities of the smellscape might be represented through maps which fulfil a role at once descriptive and suggestive; maps relay the perceived and simultaneously conjure the unimagined.<sup>197</sup> The research took place in Singapore, an island city-state that enforces cleanliness with punitive fines.<sup>198</sup> I was advised to rename the walks as "scentwalks" and subsequent representation of olfactory space as 'scentscape' mappings since "smell" connotes a lack of hygiene and would be perceived as a critique of local culture. My visualisation of smells' relationships with the landscape and with each other in airspace is hereafter known as smellscape mapping, or, as in the title of this case study's outcomes; scentscape mapping.

#### 4.1 *Representation and the scentscape*

The subject of my research has no material existence. Similar to those who map based on social media and other rapidly changing urban invisible variables, the smell dataset is both vast and constantly changing.<sup>199</sup>

Contrary to studies that suggest smellmaps might be used for human navigation, my research calls attention to the ecological nature and

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196 Classen, Howes, and Synnott, p. 98.

197 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'.

198 Adrian Mourby, 'Which Is the Cleanest City in the World?', *The Guardian*, 2015 <<http://www.theguardian.com/cities/2015/jun/15/cleanest-city-world-calgary-singapore>> [accessed 10 February 2018].

199 John Hessler, 'Assembling the World in an Image', in *Map: Exploring The World*, ed. by Rosie Pickles and Tim Cooke (London, New York: Phaidon Press, 2015), pp. 6–9.



complexity of the subjective smellscape, highlighting the potential for a human encounter with an odour.<sup>200</sup> As I have discussed previously, any such smell encounter will only be a possibility and temporary, since the smellscape itself is in a constant state of flux. My interest in the situated uniqueness of emergent smells, explored in detail in this chapter, is based on a conceptualisation of space as a constructed and changing phenomenon.<sup>201</sup> I take my lead from Lefebvre's model of space as produced by dynamic interrelationships between 'representations of space', 'representational space' and 'space as practiced over a period of time' in which visualisations of smellscapes are representations of space moving from the conceived to the perceived.<sup>202</sup> The process of rendering smell as eye-visible is similar to the process of design where conceptual statements take form to manifest as physical outputs capable of generating new relational links.

By exploring relationships between the dynamic mingling of smells in airspace and the humans that pass through that airspace, the map serves as a visualization of a world of odour molecules. Using a RTD approach, the resultant mappings focus on three relationships:

- i) Smell / place – between the most-noted smells in a neighbourhood and their mention in other parts of the city;
- ii) Smell / space – between a smell's position in 3D space and the lived-perspective of a passing human;
- iii) Smell / time – between smells of the day and smells of the night as part-imagined, part-detected.

In delineating and exploring these interconnections I highlight the individuality of human smellscape perception, partly determined by environmental

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200 Jess Porter and others, 'Mechanisms of Scent-Tracking in Humans', *Nature Neuroscience*, 10.1 (2007), 27–29.

201 Classen, Howes, and Synnott.

202 Lefebvre, *The Production of Space*, pp. 41–52.

features and partly by human odorant receptor variation.<sup>203</sup> Indeed, as summarised at the Human Olfaction Conference in 2017, 'the world smells different to everyone'.<sup>204</sup> This case study introduces design practices of detection, conceptualisation and representation of the smellscape.

Why do we need to visualise and represent smell? Indeed, why translate one sensory modality into another? To appreciate smell and to focus on the act of smelling itself would seem to outweigh translation between sensory modalities. However, when it comes to representing and communicating smellscapes the following three problems emerge:

- **Indeterminate duration of smells:** A single sniff results in an intake of hundreds of volatile odour molecules comprising background, episodic and ephemeral smells. While some smells have a short life span other 'odor molecules have a longevity beyond the mere presence of the organism that produced that signal'.<sup>205</sup> This duration of smell allows us to respond to olfactory signals in ways that differ from the immediacy of sights and sounds. Interestingly, there are also dormant smells that are re-activated by atmospheric humidity or by scratching and crushing.
- **Sensory replay:** Information from sensory modalities of sight and sound can be converted into digital forms for subsequent reproduction enabling them to be shared with relative ease; haptic technologies and materials enable us to recreate part of the experience of touch, taste can be shared through eating and drinking, but smell defies digitisation and replicability. Knowledge gained from recording urban olfactory environments may inform our ability to pay it greater environmental

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203 Veronique Greenwood, 'O.K., Computer, Tell Me What This Smells Like', *The New Yorker*, 9 October 2017 <<https://www.newyorker.com/tech/elements/ok-computer-tell-me-what-this-smells-like>> [accessed 18 October 2017]; Joel D Mainland and others, 'The Missense of Smell: Functional Variability in the Human Odorant Receptor Repertoire', *Nature Neuroscience*, 17.1 (2013), 114–20.

204 Asifa Majid and others, 'Human Olfaction Conference - Meaning, Culture, Cognition', 2017 <<http://meaningculturecognition.ruhosting.nl/news-events/events/human-olfaction-at-the-intersection-of-language-culture-and-biology/>> [accessed 24 July 2017].

205 Paul A. Moore, *The Hidden Power of Smell* (Heidelberg, New York, Dordrecht, London: Springer International Publishing, 2016), p. 21.

heed and appreciate its contextualised, subjective, nuanced role in our understanding of place.

- **Perceptual problem of abstraction:**<sup>206</sup> An alternative to replay is the use of language to describe sensed information. In the Western world, the lexical field of abstract terminology for smell is both small and imprecise when compared to other senses. Henning declared the impossibility of olfactory abstraction and Sperber opined to the absence of any 'semantic field of smells'.<sup>207</sup> Whereas Western languages use few abstract terms in their communication of smell, preferring to describe smells by their source, some global cultures signify smell with a complex lexical terminology as studies in cognitive linguistics have shown.<sup>208</sup>

Future generations, more concerned with precise olfactory communication, may invent language-independent smell-specific vocabularies such as Nasalo, an olfactory lexicon, developed by Tolaas from common smell descriptors.<sup>209</sup> However, in order to communicate the diversity of, and opportunity for, smell encounters my chosen solution is to adopt the agency Corner promotes as inherent in visual mapping 'first disclosing then staging the conditions for the emergence of new realities'.<sup>210</sup>

Representation is a fundamental tool to visual communicators and graphic designers. The graphic symbol is one such form and Ellen Lupton has argued that 'When used in a strictly didactic or expository context, an

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206 Catherine Rouby and others, *Olfaction, Taste, and Cognition* (Cambridge: Cambridge University Press, 2002).

207 Dan Sperber, *Rethinking Symbolism* (Cambridge: Cambridge University Press, 1975), pp. 115–16; Hans Henning, *Der Geruch. Ein Handbuch für die Gebiete der Psychologie, Physiologie, Zoologie, Botanik, Chemie, Physik, Neurologie, Ethnologie, Sprachwissenschaft, Literatur, Ästhetik und Kulturgeschichte*. (Leipzig: J. A. Barth, 1924).

208 Ewelina Wnuk and Asifa Majid, 'Revisiting the Limits of Language: The Odor Lexicon of Maniq', *Cognition*, 131.1 (2014), 125–38; Asifa Majid and Niclas Burenhult, 'Odors Are Expressible in Language, as Long as You Speak the Right Language', *Cognition*, 130.2 (2014), 266–70; Carolyn O'Meara and Asifa Majid, 'How Changing Lifestyles Impact Seri Smellscapes and Smell Language', *Anthropological Linguistics*, 58.2 (2016), 107–31.

209 Agapakis and Tolaas.

210 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 216.

information “graphic” is a neutral record of given data.’<sup>211</sup> Such a positivist approach to data visualization is in direct opposition to the interpretivist standpoint of this thesis, although it remains the overriding paradigm of data visualization and scientific cartography. Data recorded during a smellwalk is qualitative; numerical scales for recording smell duration or smell intensity are wholly subjective and, I argue, are best represented in keeping with the qualitative approach of their collection.

That smellscape mappings should reflect the unique, contextual, intimacy of the human perception of the smellscape is therefore fundamental, and it is with the inherent intimacy of the dataset in mind that I design smellscape representation.<sup>212</sup> From a communication design perspective, Lupton suggests that designers may use representational diagrammatic forms, such as maps, to communicate data with the goal of rendering text superfluous:

The diagram constituted the basis of a new ‘language’ of vision, suggesting the possibility of a script which would render its object transparent, a mode of ‘writing’ spontaneously generated by the world it would represent.<sup>213</sup>

As within architecture and urbanism, ‘Representations are signs interposed between something (objects, phenomena, actions) and our perceptions and understanding of that something.’<sup>214</sup> Representation is thus understood in this study as a mediated and filtered effort to make clear, to make sense of, and to share, rather than an attempt to describe an objective truth.

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211 Ellen Lupton, ‘Modern Design Theory - Ellen Lupton’, 2009 <<http://elupton.com/2009/10/modern-design-theory/>> [accessed 21 November 2017].

212 VGTCommunity, VIS 2017: [Capstone] *Data Humanism: The Revolution Will Be Visualized*, 2017 <<https://vimeo.com/241617101>> [accessed 8 February 2018].

213 Lupton.

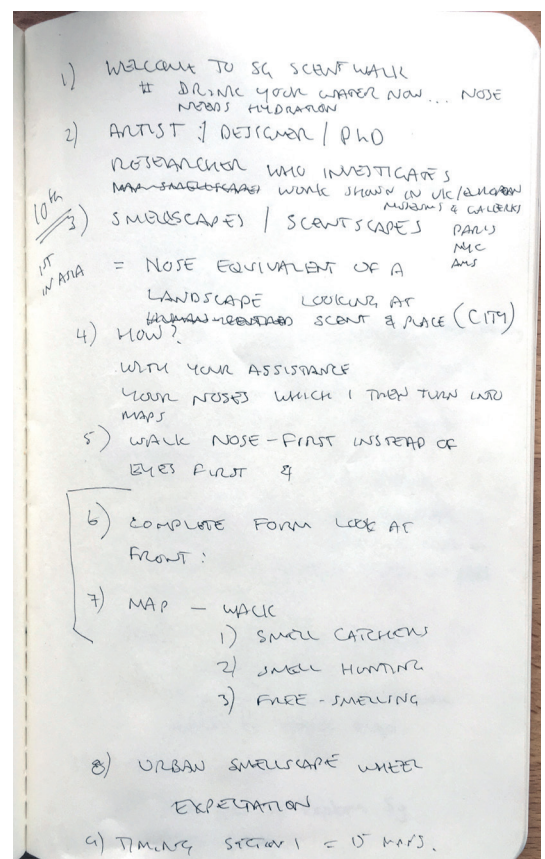
214 Fábio Duarte, *Space, Place and Territory: A Critical Review on Spatialities*. (Basingstoke: Taylor & Francis Ltd, 2017), p. 100.

## 4.2 Initial case study planning and scentwalker recruitment

The practical design work discussed in this chapter focuses specifically on primary research in Singapore during June 2015. The research was conducted in conjunction with a local company, AllSense<sup>215</sup>, who made contact in 2014 suggesting a joint project in 2015 to mark Singapore's 50<sup>th</sup> anniversary as an independent state.<sup>216</sup> Whilst we had different objectives the project benefitted each party severally; AllSense promoted their brand and commitment to providing access to local smell culture (through designer-led smellwalks) and I was able to research with locally-recruited people during nine days of smellwalks in the city. Primary research was planned for June 2015 to enable time for logistics and recruitment, and to harmonise with my UK teaching schedule.

One reason for selecting Singapore as a case study was the lack of language barrier; the entire project was conducted in English as a common language. However, in recognition of the cultural differences between the east and west in how smell is perceived my spoken introductions (Figure 4.1) at the start of each smellwalk encouraged participants to complete the description datafield of their scentnote with either the smell's source or a more imaginative statement which resulted in "stale air-conditioning" and "a hard life" as descriptors of the air in specific locations.<sup>217</sup>

**Figure 4.1:** Notebook (2015).  
Prompt notes introduction to every scent walk

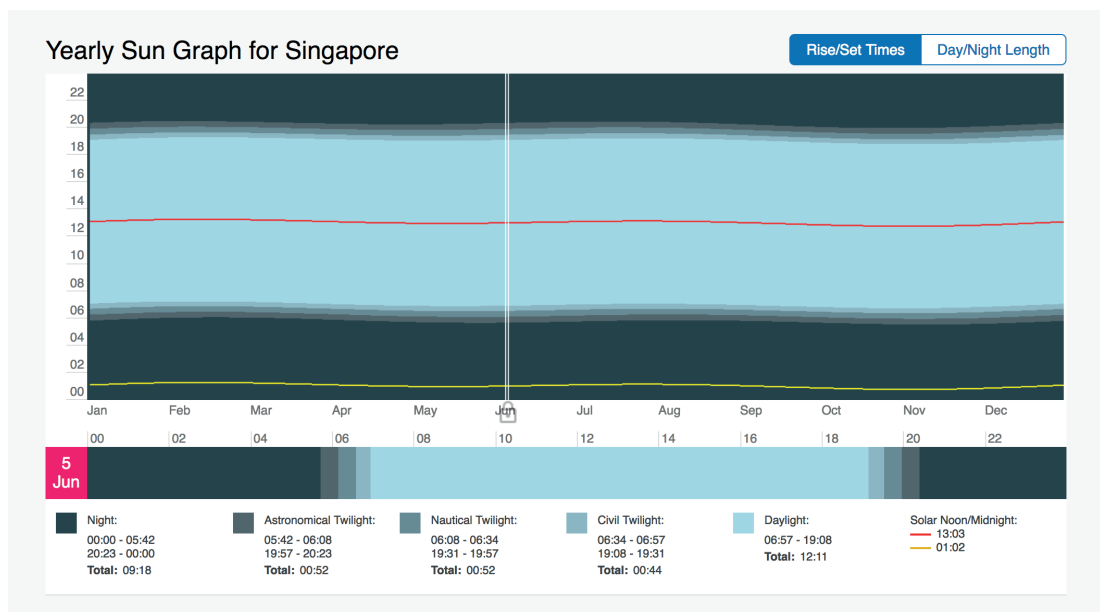


215 AllSense develop bespoke fragrances, and sell synthetic scents and scent diffusers as commercial products for brands, products, events and spaces.

216 SG50 Programme Office, 'SG50', 2015 <<https://www.sg/sg50>> [accessed 18 October 2017].

217 Maki Ueda, 'Scent as a Material or as a Phenomenon?', *Scent Laboratory*, 2017 <<http://scent-lab.blogspot.com/2017/05/an-excerpt-from-my-presentation-at.html>> [accessed 9 July 2017].

Following considerable discussion of possible themes between December 2014 and February 2015, I suggested comparing smells of the day with smells of the night after reading Lefebvre's assertion that 'smells are a part of rhythms, reveal them: odours of the morning and evening, of hours of sunlight or darkness, of rain or fine weather'.<sup>218</sup> As an equatorial country Singapore's daylight hours and temperatures are broadly constant (Figure 4.2) over the course of a year thus meeting Lefebvre's binaries of 'morning', 'evening', 'sunlight' and 'darkness' in similar temperature and climatic conditions. Minimising temperature difference might serve to focus attention on relationships between humans, activities and place with the smellscape.



**Figure 4.2:** Yearly Sun Graph for Singapore (2015). Constancy of equatorial sun-rise and sun-set time. [timeanddate.com](http://timeanddate.com)

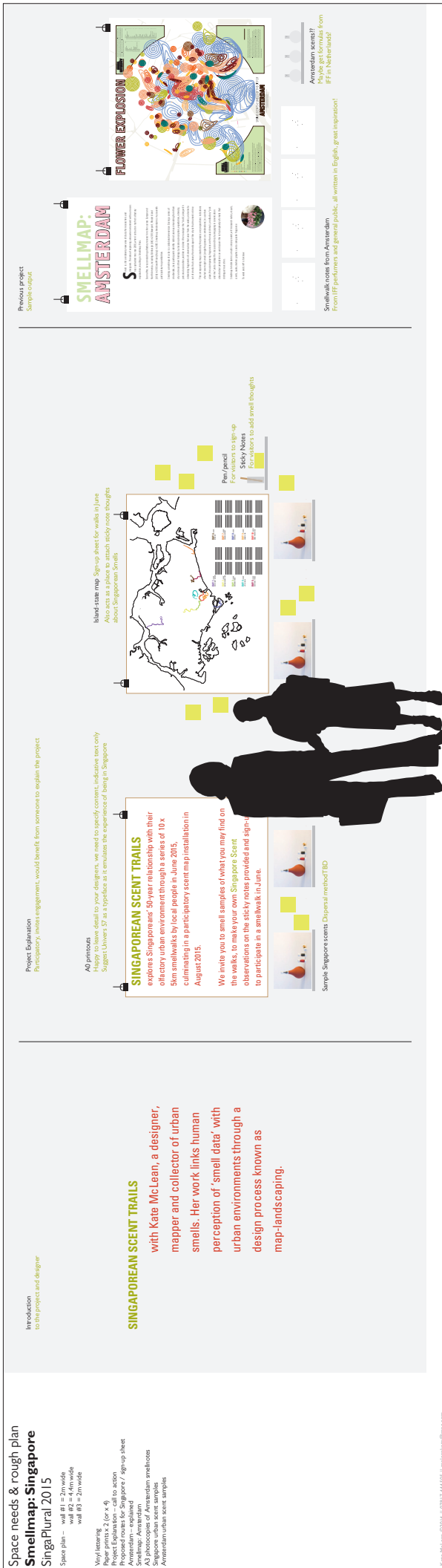
218 Lefebvre, *Rhythmanalysis*, p. 31.

To recruit scentwalkers, AllSense took an exhibition stand at SingaPlural; the anchor event of Singapore Design Week in March 2015.<sup>219</sup> I generated graphics (Figure 4.3) focussing on the participatory walking aspect of the project. AllSense's exhibition stand (Figure 4.4), for which I was not present, was a hybrid of our two perspectives and included graphics from one of my previous smellmapping projects, Smellmap Amsterdam, and a range of locally-inspired, synthetic scents.<sup>220</sup> To recruit scentwalkers AllSense placed a bowl between the scent samples for business cards from potential participants.

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219 'SingaPlural 2015 - Celebrating Design | SPRING Singapore', 2015 <<https://www.spring.gov.sg/newsevents/events/pages/SingaPlural-2015-Celebrating-Design-20150310.aspx>> [accessed 28 July 2017]; SingaPlural, 'SingaPlural Festival Structure', *SingaPlural 2017*, 2017 <<http://www.singaplural.com/>> [accessed 14 October 2017].

220 Kate McLean, *Smellmap: Amsterdam*, 2014 <<http://sensorymaps.com/portfolio/smellmap-amsterdam/>>.



Kate McLean: 0204 412381 / 0204 414105 / k.mclean@mc.com

**Figure 4.3:** Proposed Graphics sent to AllSense for Scentwalk recruitment activity (2015). Devised in January 2015 as a project explanation and recruitment tool for SingaPlural design event





**Figure 4.4:** Final scentwalk recruitment activity exhibition stand at SingaPlural (2015). AllSense's final design focused more on synthetic versions of likely Singapore scent encounters. Image courtesy of AllSense

### 4.3 *Singapore logistics and local environmental conditions*

By late May 2015 AllSense had collated a database of Singaporean scentwalk volunteers from the SingaPlural exhibition, their professional network including IFF Singapore, scent-branding customers, Gardens by the Bay (a private nature park) and a centre for the visually-impaired, SAVH.<sup>221</sup> As an independent expert in smellwalking and smellscape mapping, my role was to plan the routes including start and end points plus timings, produce bespoke scentnotes (named as smellnotes in Chapter Three) for participants to record their findings, lead the walks and create scent data artwork. All communication with participants regarding logistics, meeting times and dates came directly from AllSense who maintained a database of contacts.

221 Gardens by the Bay, 'Gardens by the Bay' <<http://www.gardensbythebay.com.sg/en.html>> [accessed 14 October 2017]; SAVH, 'Singapore Association of the Visually Handicapped – SAVH Is a Non-Profit VWO Catering to the Visually Handicapped and Blind', SAVH, 2008 <<http://savh.org.sg/>> [accessed 6 February 2018].

In December 2014, AllSense suggested the following as possible walk locations with anticipated scent encounters:<sup>222</sup>

- Singapore Botanic Gardens (flora)
- Little India (Indian foods, spices)
- East Coast Park (seafood, sea)
- Geylang (red light district, food)
- Singapore Zoo / Night Safari (flora, fauna)
- Chinatown (food, spices)
- Sentosa - perhaps one of the beaches
- Changi Airport (perhaps jet fuel etc)
- Orchard Rd (shopping street, perfumes etc)

Before the SingaPlural event, March 10 – 15 2015, AllSense finalised the neighbourhoods of Katong, Kampong Glam, Chinatown, Sentosa, East Coast Park, Gardens-by-the-Bay, Little India and Orchard Road as being representative of the city (Figure 4.5).

**DESIGNING SCENT MAP**  
**SINGAPORE**

**Designing Scent Map Singapore with Kate McLean (UK) explores Singaporeans' 50 year relationship with the scents of the city. This project will unfold through a series of Scent Walks in June 2015, culminating with a Scent Map installation in August 2015.**

Your nose is your ticket to journey over space and time to Singapore's past and present, to experience and co-narrate an emotional story of Singapore as a local place of belonging and identity. 50 years of it in fact!

McLean has completed Scent Maps for 9 cities including New York, Paris, Amsterdam and Pamplona... and now, her first in Asia, in time for our jubilee year...

Today we invite you to sniff samples of what you may find on the walks, to make your own current Singapore Scent Observations and sign up to participate in a Scent Walk.

Be a part of history, join one of Kate's Scent Walks that will take you deep into the heart of your own city to discover that 'sense of place' goes well beyond what the eye sees.

McLean's break-through work links human perception of 'scent data' with urban spaces through a process called 'maplandscaping'.

**8 WALKS IN 8 DAYS**

**Kate McLean**  
Senior Lecturer Graphic Design Canterbury – Christ Church, University, UK  
PhD Candidate, Information Experience Design (IED) – Royal College of Art  
Artist/Designer/Researcher/Mapper of Urban Scentscapes

- CHINATOWN
- PERANAKAN TRAIL (JOO CHIAT & KATONG)
- EAST COAST PARK
- ORCHARD ROAD
- KAMPONG GLAM
- SENTOSA
- GARDENS BY THE BAY
- LITTLE INDIA

**Figure 4.5:** AllSense exhibition stand SingaPlural (2015). Explanatory text to potential scentwalk participants listing the final neighbourhoods to be walked. Graphics commissioned by AllSense

222 Terry Jacobsen, 'SingaPlural 2015 x AllSense', 13 December 2014.

Following advance visits to each neighbourhood I designed uni-directional routes of approximately one kilometre in length each (Figure 4.6) with an estimated duration of 60 minutes to include a variety of sniffing opportunities. Scentwalk route maps were included on the printed scentnote booklets.

**Figure 4.6:** Scent Note map design for morning scentwalk in Kampong Glam (2015). Example of a uni-directional route listing stopping points on a contextual basemap



The scentwalks took place daily from June 3 to June 9 and again on June 11. I led two walks per day following identical routes; the first at 11am and the second at 8pm. Two additional walks took place; one on June 8 due to oversubscription at Gardens by the Bay, and the second on June 12 with staff and members of the visually-impaired centre, SAVH in Tao Payoh. All scent walkers were requested during the course of the walk to complete a scentnote form based on instructions given (Figure 4.7). I transcribed the findings into a database for analysis.

1.		Passive smelling (scents that cross your path) Smoke, cigarette cardamom, sandal
2.	smell catchers	fabric gasoline, exhaust, rubber
3.		vegetable, foamy, sewage
4.		fried food, jasmine, <sup>ply</sup> wood
5.		Active smelling (scents you seek out) fruit glasses - fruity
6.	bin gummy sack, woody	
7.	smell hunters	post box - oily, coffee
8.	metal - floral spart bowl - dried aldehydes	
9.		Free smelling (your choice of active or passive smelling) sesame oil
10.	the	herbal, dried, rose, medical

**Figure 4.7:** Example of a completed handwritten scent note (2015)

The pace of the walk was dictated by a clear fifteen minutes for each of three delineated sections in the walk, as detailed in Chapter Three; described as “Passive smelling”, “Active smelling” and “Free smelling”. I allocated time at the end of each walk for participants to read their scentnotes, define a representative neighbourhood smell and allocate a colour using a Pantone Matching System (PMS) colour guide for reference (Figure 4.8).<sup>223</sup>

223 Pantone, ‘Color Intelligence – Pantone Matching System®’, *Pantone* <<https://www.pantone.com/the-pantone-matching-system>> [accessed 13 June 2018].

**Figure 4.8:** Researcher offers scentwalk participants a Pantone colour to match their 'summary scent' with a colour (2015) End of scentwalk activity on Sentosa Island. Image courtesy of Liana Yang



During June 2015 rainfall and high humidity characterised each day. This was reflected by frequent mentions in participants' scentnotes; humidity was a background context for other smell detections. The winds were light, between 0 and 10 mph varying in direction around 360°, the low temperature remained at 27°C with a maximum high of 34°C.

Having described the environmental conditions and logistics I continue to describe a set of visual methodologies I developed to visually represent the scentscape. These are listed in the order in which they were generated.

#### *4.4 Dimensions of the scentscape: processes of visualisation*

An artist-designed summary scentmap of the city formed part of the agreed output with AllSense. To immerse myself in the scents and the atmosphere of the walks my preference is to manually transcribe participant data into a database and use Adobe Illustrator to hand-draw the maps. My previously-published visual essay deployed Kenya Hara's concept of ex-formation – in which the senses are celebrated over rational assembling of facts and success is measured through the project's ability to ignite the imagination – as a communication method for mapping smellscape (Figure 4.9).<sup>224</sup> The

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224 Kenya Hara, *Ex-Formation* (Lars Muller Publishers, 2015); Kate McLean, 'Ex-Formation as a Method for Mapping Smellscales', *Communication Design*, 3.2 (2015), 173–86.

### Scentscape 06 . 2015 City of Singapore

Scent selections from database for inclusion

Scent category	Description	Colour	Neighbourhood	Intensity	Duration
Background (Base notes)	Humidity		Off-shore Brani Island	7	7 (+1)
	Spicy, smokey, hot		Marina Bay Off-shore ECPz Chinatown Katong Toa Payoh	7 7 7 7 7	7 (+1) 7 (+1) 5 5 5
Episodic (Middle notes)	Roti prata + curry		* Katong Kampong Glam ECP	6 4 4	6 3 3
	Shisha Herby, minty, bitter, dried		Chinatown Little India * Kampong Glam * Chinatown Sentosa	7 6 7 6 2	5 5 5 5 2
	Salt, seawater & salty air		ECP Katong Kampong Glam Gardens by the Bay * Sentosa ECP	5 3 4 5 5 5	4 3 3 4 6 4
	Manila Rope Unpolished wood		Kampong Glam Gardens by the Bay * ECP Kampong Glam * Gardens by the Bay Chinatown Sentosa	4 4 4 5 4 2 2	4 3 3 4 4 2 6
	Jasmine		Katong Kampong Glam * Little India Chinatown Gardens by the Bay Katong Kampong Glam Sentosa	6 6 3 6 5 3 1 7	6 6 4 3 4 6 4 7
	Perfume, floral		* Orchard Road Gardens by the Bay Sentosa Chinatown Katong Kampong Glam * Toa Payoh	5 4 4 3 3 1 7	2 4 1 3 3 2 6
	Durian		Kampong Glam * Toa Payoh Chinatown Little India Marina East Orchard Road Gardens by the Bay	6 7 4 5 7 6 1	6 7 3 5 7 5 1

\* Representative smell of the neighbourhood

### Smell icons for creative mappings

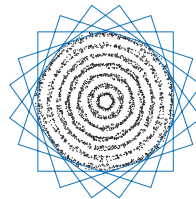
Desimini and Waldheim<sup>14</sup> argue that as design re-engages with cartography we should consider revisiting representational techniques to reconnect with the ground portrayed in the map. One technique employed by cartographers, to visualise a constant value, is the isoline (contour line). I suggest that this familiar visual language can also be used to indicate the perceived intensity of a smell. And in representing an invisible, volatile cloud extant visualisation might be repurposed to reveal the immersive potential in mapping invisible and ephemeral sensory percepts.

#### Intensity



Average intensity of 1 = 1 single ring of tiny dots  
Average intensity of 7 = 7 concentric rings of tiny dots

#### Duration



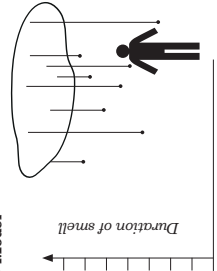
Average duration of 1 = 1 single set of (concentric) rings  
Average duration of 7 = 7 sets of (concentric) rings  
Angle of rotation =  $\frac{360^\circ}{\text{No. of layers}}$

#### Movement



Concentric 'smell isolines' are manipulated according to wind direction and speed recorded over the period of the research, creating clouds of smelldata.

#### 3-D Model



The north-east section of Scentscape 06 . 2015 Singapore was isolated and explored in detail. The smelldata in the form of individual dots was represented by beads hung in dimensional space. Height (z-axis) represents smell duration.

Figs. 29 - 32 | Smellscape map symbol creation ©2016 Kate McLean

findings in the visual essay built on previous smellscape mapping projects, deploying the textual analysis process I developed during *Smellmap: Amsterdam* and the visual language from *Smellmap: Glasgow*.<sup>225</sup> Steps of observation and abstraction, selection and omission, codification and symbolization, projection and classification inform the design process, together with Corner's mapping operations framework of 'fields', 'extracts' and 'plottings'.<sup>226</sup>

The 'fields' of a map include its boundaries, scale, projection, information hierarchy and the organisational graphic system through which collected data are visualised. All scentwalks took place within easy reach of central Singapore to facilitate scentwalker access. The borders of the map were determined by the scentwalk locations; from Toa Payoh to the north, the island of Sentosa to the south and west and East Coast Park to the east. Because Singapore is in the northern hemisphere I decided to retain a conventional orientation with north at the top, with neither co-ordinates nor grid. The scale can be determined by someone with local knowledge, but is not made explicit. A section of the city is contained by a graphic border and, through a common cartographic language, the coastline and the city can be imagined to continue beyond the confines of the map's rectangular neatline. Simplifying the 'land-sea border' to a single line was intended to direct attention to the pervasiveness of smell across the built environment, local topography and surrounding ocean.

The 'extracts', or 'things that are observed within a given milieu and drawn onto the graphic field', are the over one thousand smell detections recorded by the two hundred smellwalkers.<sup>227</sup> To conduct a textual analysis of scent data I read the scent descriptions looking for key words, forming

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225 Kate McLean, 'Smellmap: Glasgow', in 26 *International Cartographic Conference : August 25 - 30, 2013 : Proceedings*, ed. by Manfred F. Buchroithner (presented at the 2013 From Pole to Pole, Dresden: International Cartographic Association, 2013), pp. 304–5; Kate McLean, 'Smellmap: Amsterdam – Olfactory Art & Smell Visualisation', *Leonardo*, 2016.

226 Harley, 'Deconstructing the Map', p. 11; Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 229.

227 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 230.

loose groupings of similar scents and extracting some curious descriptions and anomalies. As a scentwalk participant I was able to locate scent datapoints on a basemap. Background elements of wind speed and direction affect distribution and dispersal of scents contributing to manual processes of datapoint manipulation.

'Plottings' draw out what Corner refers to as the 'new latent relationships that can be seen amongst various extracts in the field'.<sup>228</sup> My criteria was to show a key scent for each walk location, and then seek any mention of it in other parts of the city. This resulted in nine original scents to compare. The relative size of each scent was determined by an aggregate of the scent intensity data and the density of each scent determined by an aggregate of the scent duration data at each walk site. I was also keen to illustrate the theoretical structure of the smellscape by including background, episodic and curious smells (Figure 4.9). The resulting relational structure is an imaginative drawing-out of scent detections that enables a re-territorialisation of airborne space above Singapore's surface landscape.

I visualized smell data into swarms of dots for three reasons: to indicate their molecular derivation, to represent perception of the dataset as a series of individual occurrences and to illustrate the omnipresent humidity. The resulting swirls of small dots are thus an imagined and projective mapping that might also be understood to represent the experienced confusion of smell detection at street level, which in turn enables disparate complexities to emerge as a spatial and social whole.<sup>229</sup> The final map (Figure 4.16) can be seen on page 132.

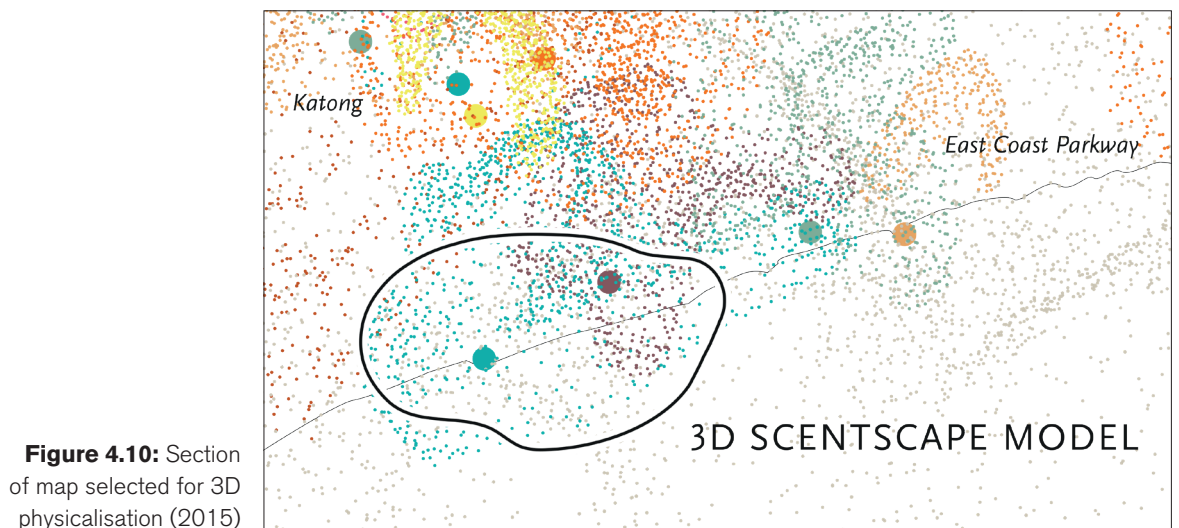
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228 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 230.

229 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'.



This thesis regards the smellscape as occupying a volumetric space within the medium of air.<sup>230</sup> Solid terrain, three-dimensional relief mapping is currently deployed across disciplines from geological sciences to artistic bathymetric sculptures, from tactile mapping for the visually-impaired to immersive VR for entertainment, military and education.<sup>231</sup> Based on Huron's definition of data physicalisation, 'encoding data in physical artefacts', I explored the relationship between people and airborne scents, zooming in on one section from the Singapore map (Figure 4.10) and using beads on nylon thread knotted into clear acrylic to represent the physicality of smell molecules.<sup>232</sup> The issue of vertical exaggeration arose when extruding from 2D to 3D which is a common phenomenon in relief mapping.<sup>233</sup> In this case I conducted practice-based tests until I felt the



**Figure 4.10:** Section of map selected for 3D physicalisation (2015)

- 230 Humans and other mammals receive odour molecules (a form of chemical signalling) through air currents whereas other chemical sensing-creatures, such as sharks and crayfish, receive theirs through water. Moore discusses this in detail in *The Hidden Power of Smell*.
- 231 Stephen Graham, *Vertical: The City from Satellites to Bunkers* (London ; New York: Verso, 2016); Zbigniew Malolepszy, 'Three-Dimensional Geological Maps', in *The Current Role of Geological Mapping in Geosciences*, NATO Science Series (Dordrecht: Springer, 2005), pp. 215–24; The Giving Tree Gallery, 'Nautical Wood Maps | 3D Wooden Topographic Art | Wood Chart', 2017 <<https://www.nauticalwoodmaps.com/>> [accessed 28 August 2017]; Ann Gardiner and Chris Perkins, "It's a Sort of Echo...": Sensory Perception of the Environment as an Aid to Tactile Map Design', *British Journal of Visual Impairment*, 23.2 (2005), 84–91.
- 232 Samuel Huron and others, 'Let's Get Physical: Promoting Data Physicalization in Workshop Formats' (ACM Press, 2017), pp. 1409–22.
- 233 Eduard Imhof, *Cartographic Relief Presentation*, 3rd edition (Redlands, Calif. : S.I.: ESRI Press, 2007).

space between smell “molecules” on the z-axis harmonised with their x- and y-axis positioning.<sup>234</sup> Scentwalker recorded smell duration levels of between one and seven were the increments I used to determine the relative height of a smell from ground level. This was inspired by the theory that the molecular weight of most scents are heavier than air and thus odours are stronger at ground level ‘where smells tend to linger’.<sup>235</sup>

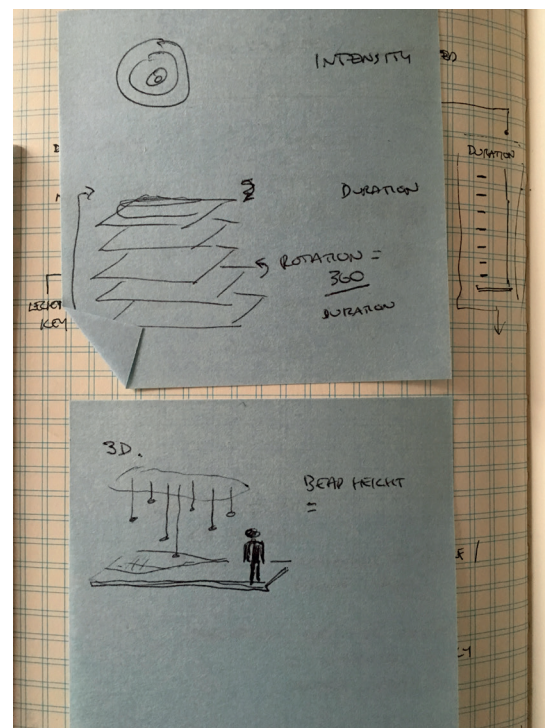
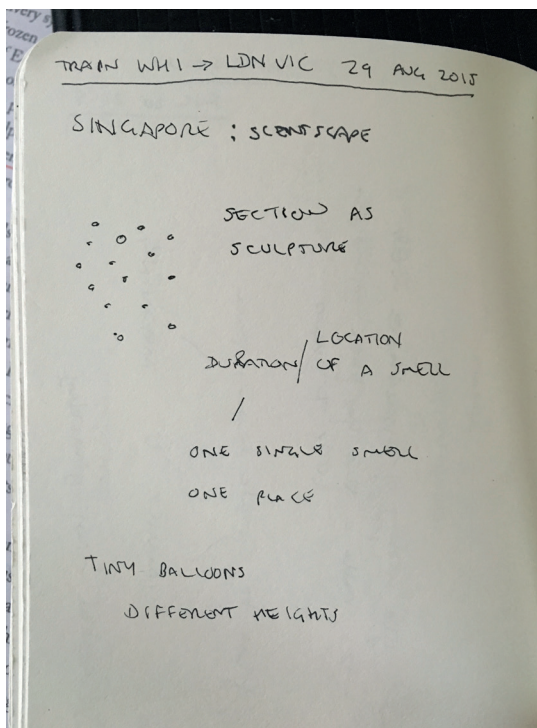
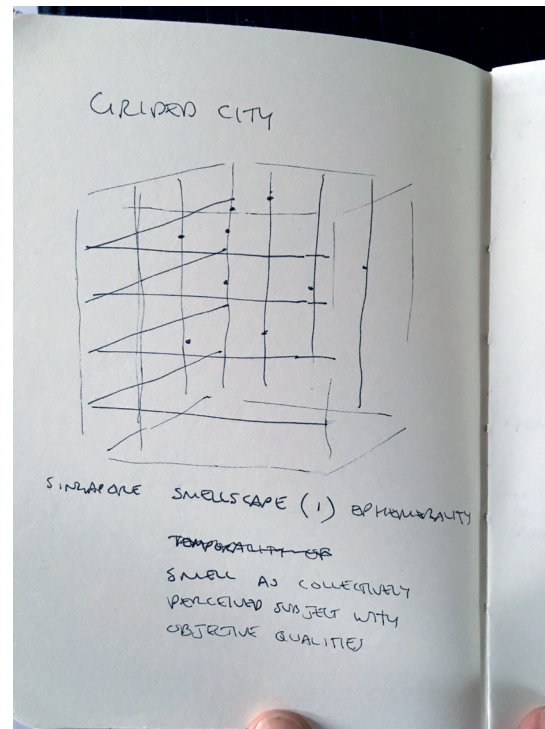
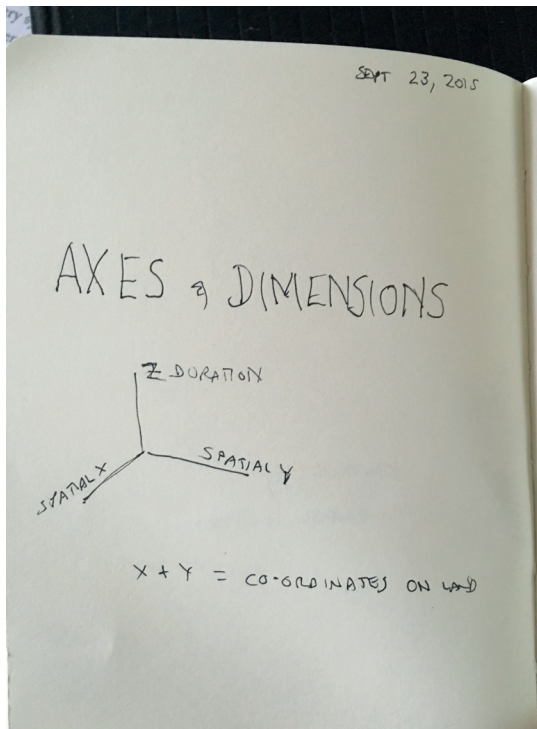
Visual explanations (Figures 4.9 and 4.10) and hand-drawn sketches (Figures 4.11 and 4.12) serve to annotate my design thinking as I designed and tested placement of the various materials; one goal was to ensure the beads could move freely so as to communicate the vibrational qualities of smell molecules. The resulting scentscape sculpture enables a viewer to navigate and explore potential smell combinations at different heights and in different places. This prototype method provides reference for future designers offering extensibility to build on the model and render ever more comprehensive scentscapes, both physically and digitally.<sup>236</sup>

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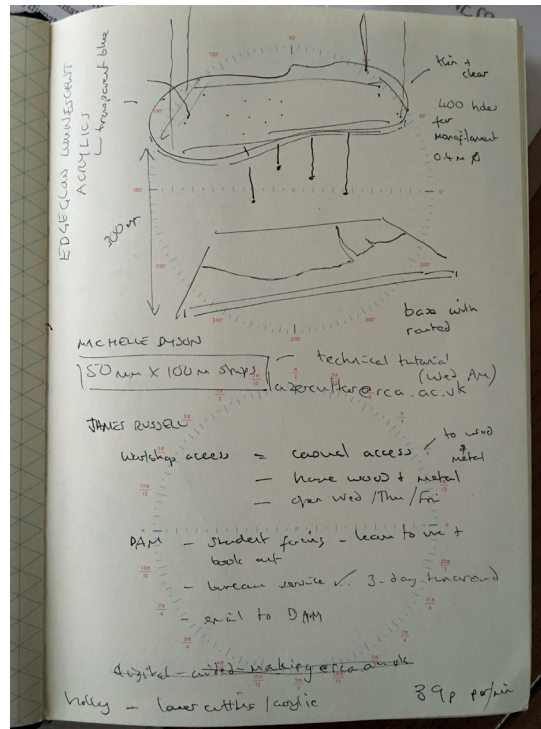
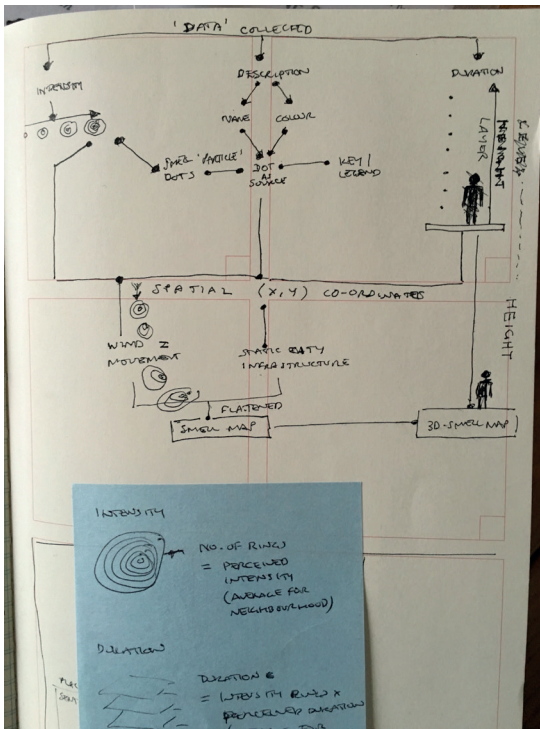
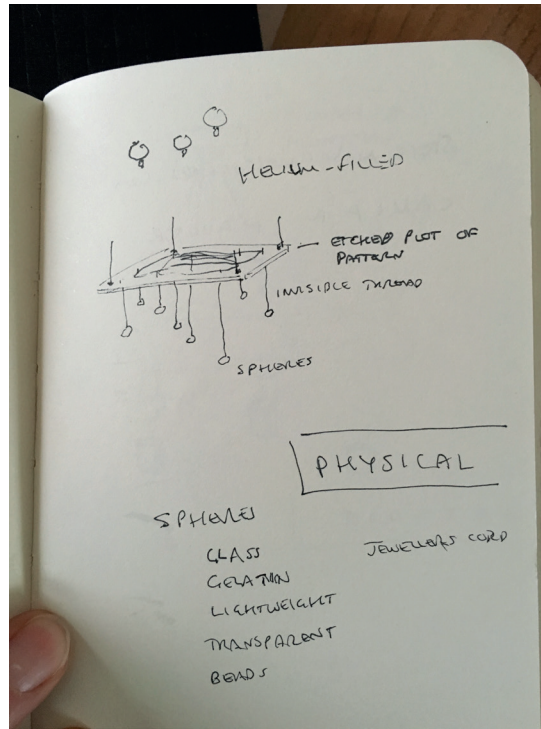
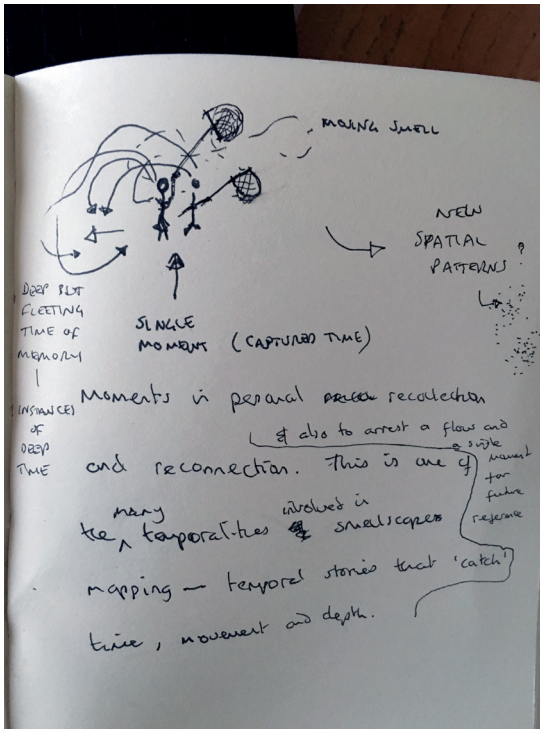
234 <https://vimeo.com/152214603>

235 Porteous, p. 25.

236 Godin and Zahedi.



**Figure 4.11:** Design thinking processes behind 3D scentmapping (2015). Top left: Selecting olfactory data for a 3D rendering of the smellscape, Top right: The 'Gridded City' as a dimensional space in which smells, or absence of smell, would be placed onto 3D coordinates, Bottom left: Possible sculptural forms for the smell instances in a 3D mapping included small balloons, Bottom right: Reverting to the original map and changing the angle of view to render smell as 'eye-visible'



**Figure 4.12:** Design thinking processes behind 3D scentmapping (2015). Top left: An opportunity to physically catch smells using nets if balloons were deployed, Top right: Consideration of spheres for the model, Bottom left: Focus on the 'dot' as source of smell instance and a model of the types of mapping in 2D and 3D as representational for a smellscape, Bottom right: Design, materials and workshop access

This process of modelling the scentscape is a preliminary design exercise, as articulated by Cross<sup>237</sup> (see page 65), towards further research conceiving and remediating the scentscape as an immersive experience, which I discuss in Chapter Six (see footnote 376, page 212).

Smellsketching with watercolour is a personal practice since 2011, as indicated in Chapter Three (see page 83). Here, I used smellsketching as an interpretative tool prior to visual analysis exploring the differences between morning and evening walks. I visually transcribed each scent noted by individual participants during the morning and evening walks using a combination of wet-on-wet and dry-brush techniques to create multi-layered sketches ensuring, 'The subjectivity of the original perception is retained through a method that is tolerant of imprecision'.<sup>238</sup>

I painted a total of eighty-two watercolour trajectory mappings (totalling nine hundred and eighty-four individual sketches) of participants' scentnotes. To compare morning and evening fairly I ensured I painted a matching number of scentwalker notes (in most cases six participants from morning and six from evening). It was an experience I found emotionally draining; during each scentwalk painting session I adopted three roles; walk leader, scentwalk participant and external observer/interpreter. As walk leader, with documentary photographic evidence, I found it relatively easy to recall each scentwalk experience. However, entering the nose, the scent note observations and occasionally the memories of another person was energy-depleting and a disconcerting activity. The resulting interpreted data is both 'imperfect' and 'subjective' and derives from individual scentwalkers.<sup>239</sup> In representing detected scents, I felt bound to represent more than the name, also taking into account any associated qualities or comments.

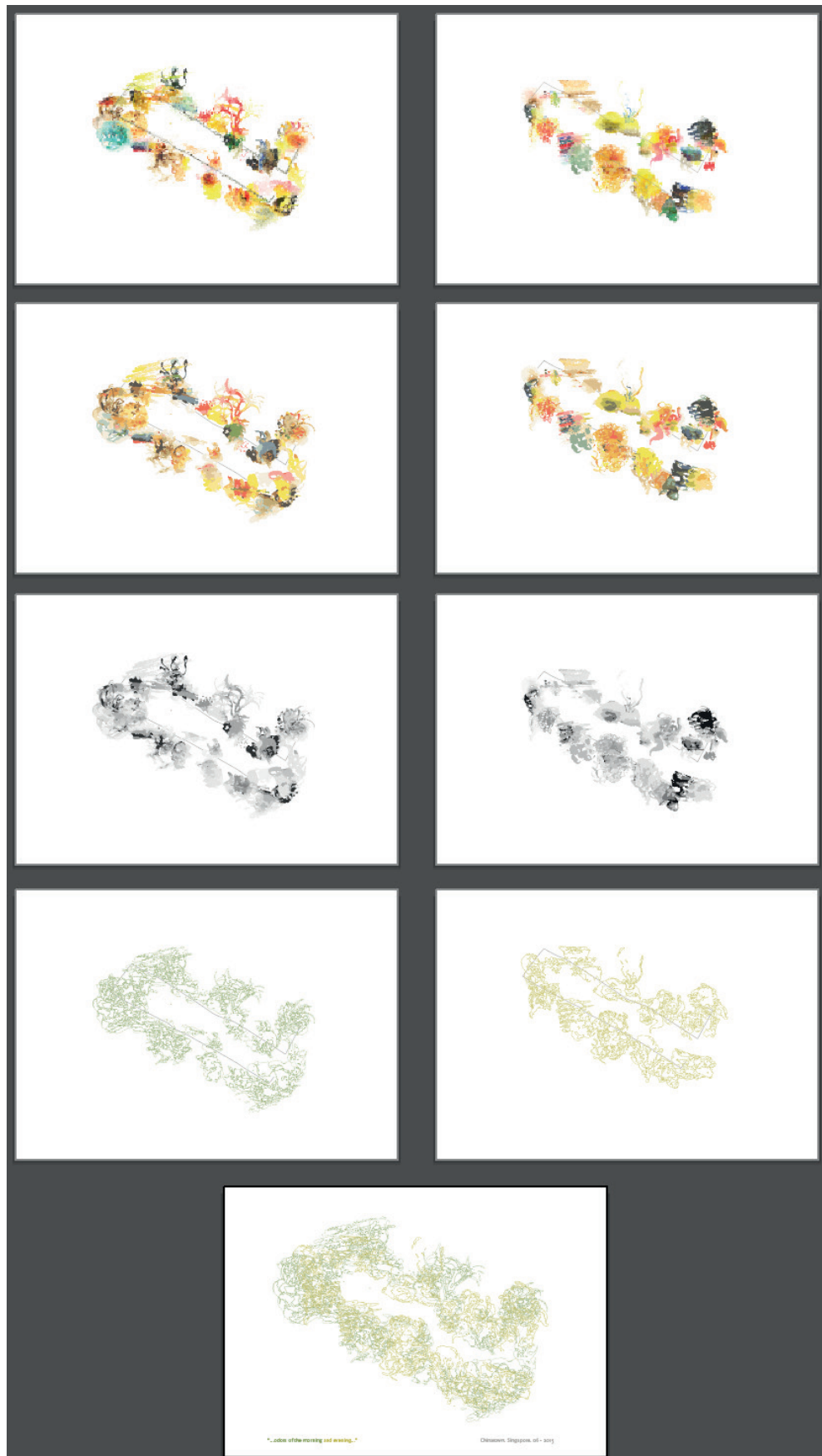
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237 Cross.

238 McLean, 'Ex-Formation as a Method for Mapping Smellscapes', p. 178.

239 Giorgia Lupi, 'Data Humanism: My Manifesto for a New Data World', *Giorgialupi*, 2016 <<http://giorgialupi.com/data-humanism-my-manifesto-for-a-new-data-world/>> [accessed 28 December 2016].

While the sketches provided a side-by-side visual comparison of night and day, I decided to overlay the sets of experiences to bring the work in line with collective understanding of other scentscape mappings in this case study. I scanned the smellsketches, eliminated background noise, and combined the sketches into morning and evening routes. Reducing opacity enabled me to see through the layers and create composite puddles of smell representing up to six scentwalkers in one place at one time. I digitally analysed each image into 16 colour hues, extracted outlines and finally layered two outlines per location in order to achieve a direct comparison for morning and evening smells (see fold-out map, Figure 4.26, page 142). The outcomes are analysed and discussed later in this chapter (pp. 141 – 143).



**Figure 4.13:** Generation of layered scentscape profiles. Chinatown (2017) morning (left column) and evening (right column), 6-layer watercolour (top), 16-colour vector (2nd to top), grey scale vector (middle), outline (2nd from bottom), morning and evening outlines combined to create: '*odours of the morning and evening*' (bottom)

## 4.5 *Constructing a scentscape: marks, symbols and concepts*

As indicated previously, this study regards mapping of smellscapes as 'constructions' over 'direct representation' with main foci on spatial presentation of smell and resulting relational arguments with potential agency for the creation of new imagined environmental spaces. As Corner argues, mapping should be regarded as neither representational nor accurate, but rather 'doubly operational: digging, finding and exposing on the one hand, and relating, connecting and structuring on the other'.<sup>240</sup> This chapter has itemised the decisions I made in adopting three distinct approaches to mapping the smellscape through the lens of spatial cartographic design. The human-perceived and recorded olfactory data was interpreted and presented through graphic marks, symbols and concepts which, as Krygier and Wood point out, depend on the conceptual framework of the mapmaker.<sup>241</sup> I continue to explain my rationale for adopting conventional mapping symbols, specifically the contour line, figure-ground, line, hachure, colour and text to represent imagined trajectories of the smellscape.

Waldheim and Desimini define the contour as a 'representational staple of topographical description and projection'.<sup>242</sup> This terrestrial symbol, which emanates from isobaths and has an aerial counterpart in the isobar, is an abstraction that denotes depth or height and connotes incline. It is used by landscape architects to 'envision, describe and dictate the merits of earth and material in the field' thus conveying a sense of possibility, especially when layered onto existing maps or aerial photos.<sup>243</sup> The air-based isobar denotes eye-invisible measurements of barometric pressure connoting

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240 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 225.

241 John Krygier and Denis Wood, *Making Maps: A Visual Guide to Map Design for GIS*, 2 edition (New York: Guilford Press, 2011).

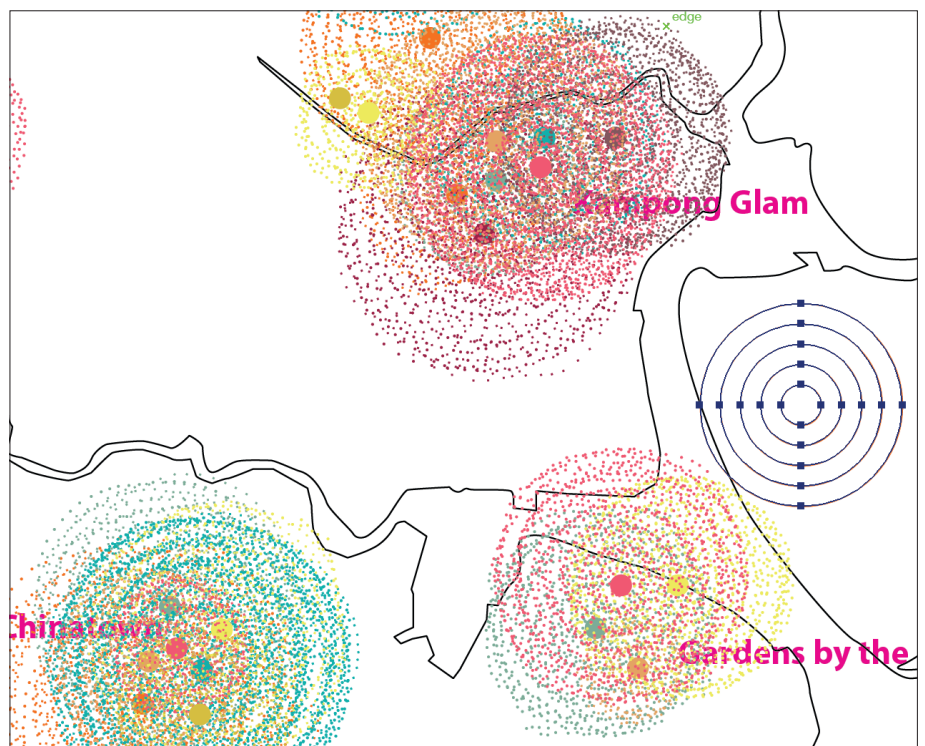
242 Waldheim and Desimini, p. 47.

243 Waldheim and Desimini, p. 47.



the relative stability of weather conditions and wind speeds and, in animated form, is a common feature of weather mapping indicating change.<sup>244</sup>

My placement of small dots to represent rings of scents in *Scentscape Singapore* (Figure 4.14) is based on the abstract nature of the isopleth which cannot be seen in the landscape, the sea or the air. Where other cartographic symbols represent or depict a visible certainty, provisional contour lines suggest peaks and troughs, depths and height, allowing the reader to complete their own picture of the quality of the space. As such the smell contour, which is further removed from the measure of a physical contour by its capacity to overlap, can be regarded as a tool for building and creating the shape of the smellscape, and in so doing sets the conditions for a 'new eidetic and physical world to emerge'.<sup>245</sup> Proposed shapes of the smellscape are determined through rendering it eye-visible where the emphasis, as elucidated by Corner, 'shifts from object



**Figure 4.14:** Scentscape Singapore under creation (2015). Concentric circles used as guides upon which to place circles of dots to represent aggregated smell intensity of perceived scents

244 Mark Harrower and Sara Fabrikant, 'The Role of Map Animation for Geographic Visualization', in *Geographic Visualization* (Chichester, West Sussex: Wiley-Blackwell, 2008), pp. 49–65.

245 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 214.

appearances to processes of formation, dynamics of occupancy, and the poetics of becoming'.<sup>246</sup>

Figure-ground separation, a Gestalt principle of design, asserts that human perception groups similar objects together. Figure objects can be defined as having a definite shape and appear closer with a clear location in space.<sup>247</sup> In its simplest form it is usual that the figure is filled in and the background left blank. Desimini argues that cartographers have adapted the principle in order to articulate 'gradations and nuance' – both of which are fundamental to my conceptual understanding of the smellscape.<sup>248</sup> Figure-ground is argued to be representationally simple and graphically strong. In my case, the smells are the figures occupying a largely featureless background calling attention to their clustering and dispersion. And while the smell symbols occupy less physical space than the ground they inhabit as Tufte notes, the 'negative areas are also informative',<sup>249</sup> alluding to the many breaths when no smell is noted.

In cartography, lines are deployed in a variety of forms from hatching (in which they serve as a tool to indicate solid forms) and contours (whereby they join points of equal value). However being versatile they also communicate borders, roads and routes. As representational objects of two dimensions, Desimini suggests that their power to guide map users lies in their proximity to other symbols representing the experiential content of the landscape.<sup>250</sup> Within this case study I propose line to depict boundaries; the land-sea divide in *Scentscape Singapore I and II*, and to spatially indicate the extent of smell duration in the '*odours of the morning and evening*' mappings.

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246 *Recovering Landscape: Essays in Contemporary Landscape Theory*, ed. by James Corner (New York: Princeton Architectural Press, 2000), p. 159.

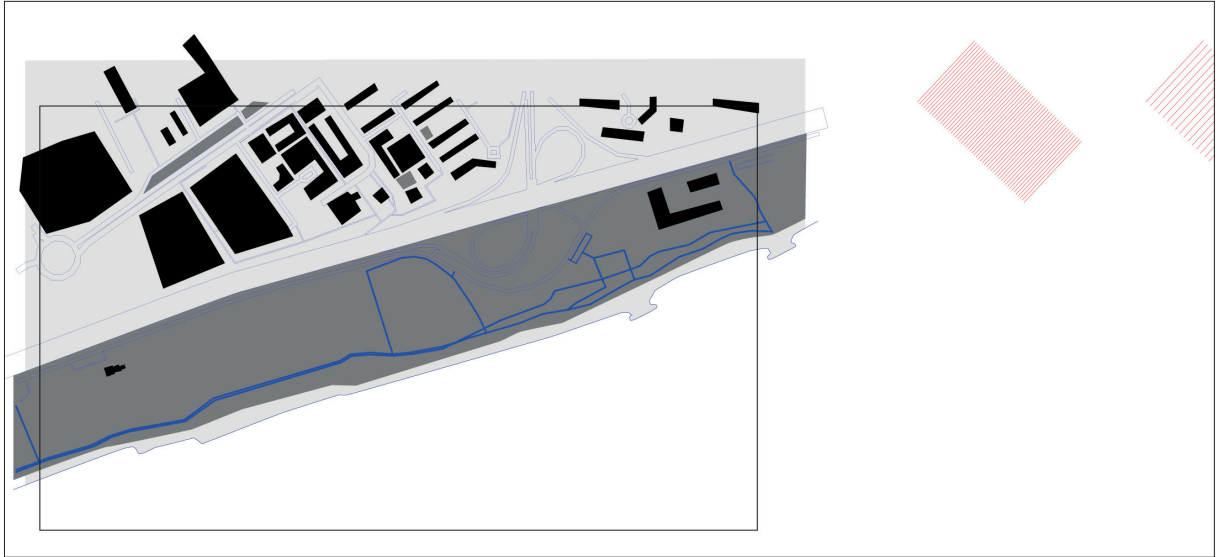
247 William Lidwell, Kritina Holden, and Jill Butler, *Universal Principles of Design: 100 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach Through Design* (Gloucester, MA: Rockport Publishers Inc., 2007).

248 Waldheim and Desimini, p. 137.

249 Edward R. Tufte, *Envisioning Information* (Cheshire, Connecticut: Graphics Press USA, 1990), p. 58.

250 Waldheim and Desimini, p. 198.

The use of lines to fill a given shape may be used as both an indication of gradient (a technique known as hachure) and also as a fill (an architectural technique to describe textural qualities).<sup>251</sup> I used hatch in its architectural capacity when designing etch patterns for the clear acrylic base map of Singapore as representative of the difference between built and natural environments, with the sea being left clear (Figure 4.15).



**Figure 4.15:** Vector file prepared for laser etching (2015). Blue lines indicate solid line and greys and blacks show different grades of etch, red sections indicate tests of etch line proximity

Joseph Albers regarded colour as 'the most relative medium in art' citing the interdependence and contextualisation of colour as the most important realisation for artists to grasp.<sup>252</sup> When smellscape mapping, I convey the context of the local environment through colours attributed to smell symbols. Within cartography, Imhof's rules for the use of colour composition are based on adjacency of colour blocks and he advocates sparing use, 'If one limits strong, heavy, rich and solid colors to the small areas of extremes, then expressive and beautiful patterns occur'.<sup>253</sup> Conventional advice from map design suggests, 'If your data are qualitative, choose a visual variable that suggests qualitative differences, such as

251 Waldheim and Desimini, p. 73.

252 Josef Albers, *Interaction of Color*, 50th Anniversary (New Haven Connecticut: Yale University Press, 2013), p. 65.

253 Imhof, p. 72.

shape or colour hue'.<sup>254</sup> In a previous work, *Smellmap: Glasgow*, I looked to the colour of the smells' sources and selected hues, values and chromas for a single mapping that I found to be both distinctive and harmonious.<sup>255</sup> Working on smellmapping projects in Pamplona and Amsterdam, I selected the colours for urban smell classifications based on colours found in the city itself to create connections to the visual ambience of the city.<sup>256</sup> For this study I decided to select colours for smells based on scentwalker associations. At the end of each walk I requested they select from a Pantone Matching System (PMS) book (Figure 4.8). PMS, a standardised key used by designers to eliminate vagaries of colour description based on visual memory, proffers a wide range of nuanced shades and tints obviating over-simple colour naming.<sup>257</sup> For each location, I selected a colour from the range indicated by the scentwalkers. Thus ocean scents are a turquoise blue, Manila rope is pale brown, herbs are a dried mint green and humidity is a pale silver-grey.

My typographic choices were inspired by an exhibition entitled 'Singapore Stories: Island of Maps', where I was drawn to the geometric, sans serif typefaces of the 1930s.<sup>258</sup> To make the design more contemporary I chose Scala Sans, a Dutch-designed, geometric typeface from 1993. The title, legend and cartouche serve several purposes; firstly to assist the reader in conceptualising the content and context of the map, secondly to enable increased levels of abstraction within visual symbolisation and thirdly, to draw attention to the theoretical structure of the smellscape. I placed the text elements in negative space to balance the overall composition.

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254 Krygier and Wood, p. 177.

255 McLean, '26 International Cartographic Conference'.

256 Kate McLean, 'Mapping the Invisible and the Ephemeral', in *The Routledge Handbook of Mapping and Cartography*, ed. by Alexander J. Kent and Peter Vujakovic (Abingdon: Routledge, 2018), pp. 500–515; McLean, 'Smellmap: Amsterdam – Olfactory Art & Smell Visualisation'.

257 Albers.

258 'Off The Record » Island of Stories: Singapore Maps' <<http://www.nas.gov.sg/blogs/offtherecord/island-of-stories-singapore-maps-exhibition/>> [accessed 13 June 2018].

## 4.6 Discussion: layers, patterns and place

In my practice, a series of creative acts result in ontogenetic representations of the smellscape. Physical mapping practices image the smellscape for the perceiver. I now consider each of the three main mapping strategies and outcomes in this case study in turn to indicate what each reveals.

*Scentscape 06 • 2015 The City of Singapore*, referred to as *Scentscape Singapore I*, reveals a summary of the city's scents – listed in the legend these descriptors form the map's content (see fold-out map, figure 4.16, page 132)

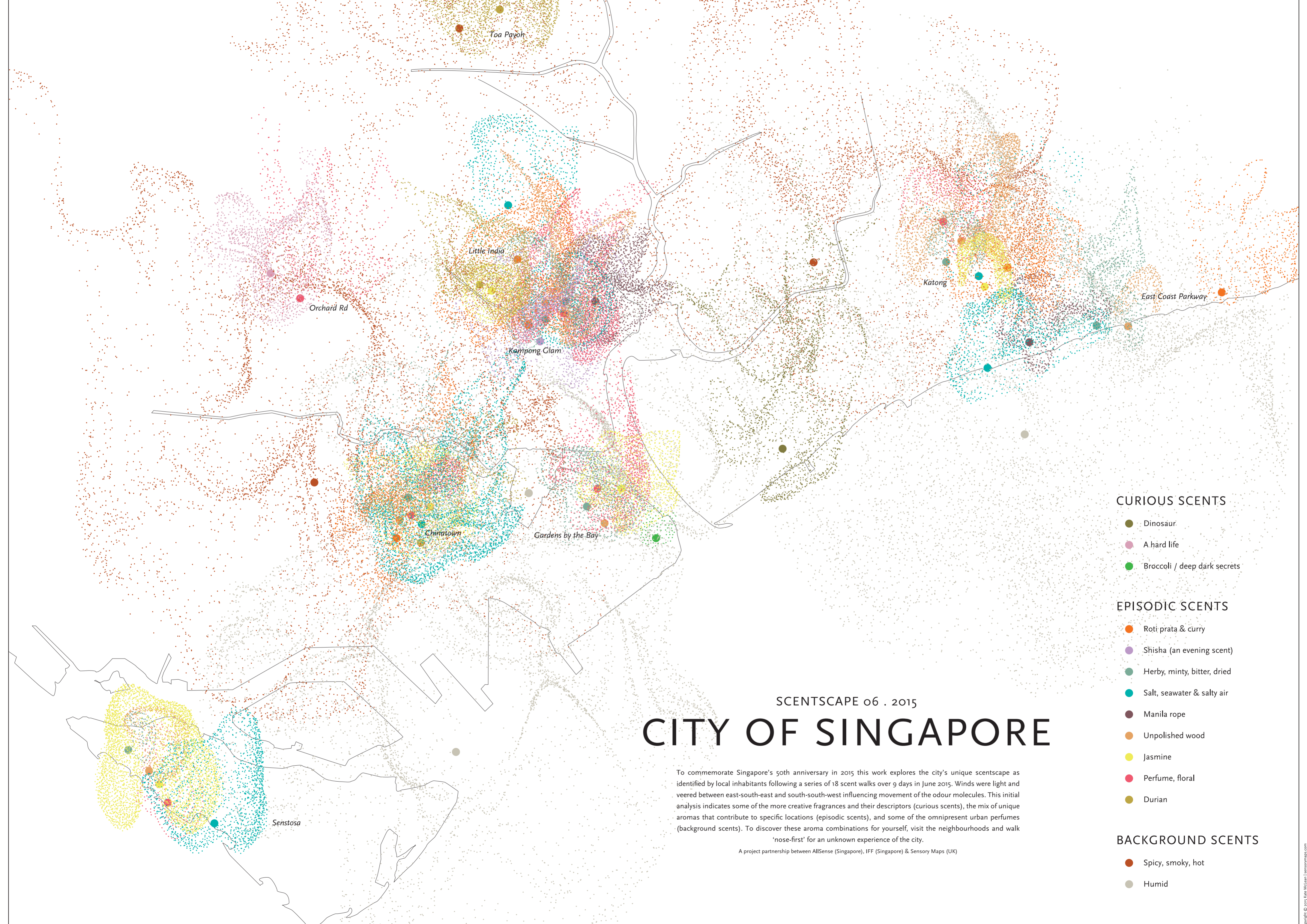
'Humid', a background smell, is listed at the bottom of the legend where it acts as a base note to the remainder of the Singaporean scent cocktail. The lighter 'curiosity' scents of 'dinosaur' and 'deep, dark secrets' are listed at the top of the legend since, similar to the top notes of a perfume, they are likely to dissipate quickly. This leaves the middle notes in the centre to form the character, coalescing into the heart notes of the city's fragrant profile. As Krygier and Wood declare, 'The legend is the key to interpreting the map', here translating a mass of yellow-green dots into the scent of jasmine.<sup>259</sup>

Each individually-named scent is representative of a specific part of the city, and is seen to be contingent to place. Patterns of smell are associated with specific neighbourhoods; Sentosa and East Coast Parkway are the places to go to sniff sea, salt water and jasmine, however if you want to experience more local produce, such as durian, then visit the Toa Payoh neighbourhood. Along Orchard Road 'a hard life' is formed with base notes of stale air from twenty year-old air-conditioning units, lingering remnants of cigarette smoke caught in clothing, cheap oils from massage parlours, and synthetic off-gassing from a stationery shop selling plastic toys and biro. This particular scent sits amidst the wafts of 'perfume' and 'roti prata'.

It is important to note that scents are tethered to sources over both land and sea; humidity from the sea spreads throughout the city just as

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259 Krygier and Wood, p. 108.



**CURIOUS SCENTS**

- Dinosaur
- A hard life
- Broccoli / deep dark secrets

**EPISODIC SCENTS**

- Roti prata & curry
- Shisha (an evening scent)
- Herby, minty, bitter, dried
- Salt, seawater & salty air
- Manila rope
- Unpolished wood
- Jasmine
- Perfume, floral
- Durian

**BACKGROUND SCENTS**

- Spicy, smoky, hot
- Humid

SCENTSCAPE 06 . 2015  
**CITY OF SINGAPORE**

To commemorate Singapore's 50th anniversary in 2015 this work explores the city's unique scentscape as identified by local inhabitants following a series of 18 scent walks over 9 days in June 2015. Winds were light and veered between east-south-east and south-south-west influencing movement of the odour molecules. This initial analysis indicates some of the more creative fragrances and their descriptors (curious scents), the mix of unique aromas that contribute to specific locations (episodic scents), and some of the omnipresent urban perfumes (background scents). To discover these aroma combinations for yourself, visit the neighbourhoods and walk 'nose-first' for an unknown experience of the city.

A project partnership between AllSense (Singapore), IFF (Singapore) & Sensory Maps (UK)

roti prata and Manila rope extend offshore. Portraying scent data as clouds of dots reveals the full complexity of the scentscape and 'entails an active and creative interpretation of the map to reveal, construct and engender latent sets of possibility'.<sup>260</sup> My intention is to encourage the map reader to imagine nuanced variations of a single sniff through the visual collection of coloured dots.

Where individual smell perception might tell each of us what is happening at one place and time, to witness the scentscape through the map is to see multiple perspectives as an overview at a moment in time. The next instant may be different as each smell drifts, dissipates, is masked by stronger odours or recombines chemically. *Scentscape 06 • 2015 The City of Singapore* (Figure 4.16) is a summary overview; humans may not be able to know through the nose of another, but they can construct scenarios and imagine. Rendering of smells as an environmental layer above an abstraction of land and sea also serves to link smell firmly to the places in which it is found and to indicate the experiential olfactory potential of a real-life visit. The map brings an everyday scentworld into being as invisible data takes on form and structure.

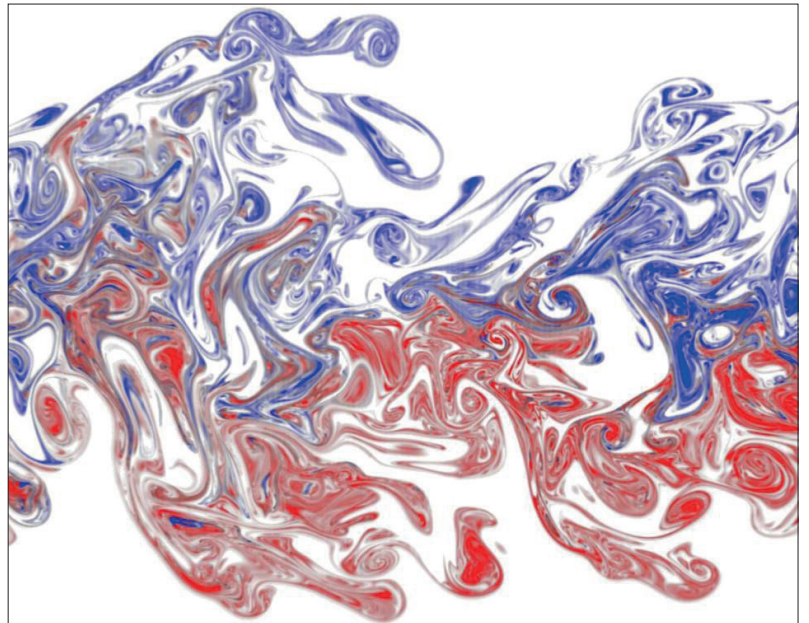
This representation situates the smellscape as entirely airborne, drawing attention to its position above the land and the medium through which smells are transmitted to human noses, through layering of visual elements. The map displays the Singapore scentscape from above. To my mind the swarms of odour molecules are akin to a murmuration of starlings; a static depiction of a mutable, volumetric mass. I suggest, that with imagination, it is possible to envisage a morphing shape in place of the static one presented. However, as a static image it is interesting to note how closely the image resembles the odour filament modelling created by Crimaldi's engineering lab (Figure 4.17) whose work I encountered after developing this piece.<sup>261</sup> The relationship between my imaginative rendering

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260 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 230.

261 John Crimaldi, 'Our Team', *Odor Navigation*, 2015 <<https://odornavigation.org/research-team/>> [accessed 17 March 2017].

of smell data and the engineered visualisations reflect a mutual understanding of the movement of odour molecules in conditions of flow and turbulence. The two perspectives are completely different; Crimaldi deploys an algorithm for odour dispersion patterns, whereas my poetic work constructs an imagined smellworld that draws attention to the diversity of individual experience.<sup>262</sup> The visual similarities point to potential for shared science-art interdisciplinary work in the future.



**Figure 4.17:** Computer model visualising two odour plumes (2015).  
John Crimaldi

The hybrid nature of this personal-collective-lived map is an imagined projection of sensed space; one that is impossible to empirically sense from direct experience. Any visualization of a mass moving in air or in water requires a spatial and a temporal dimension and also a volumetric one. It is to this that I turn next.

I created *Scentscape Singapore II*, a sculptural model, in my studio during the autumn of 2015. This piece was a logical follow-on from *Scentscape 06 • 2015 City of Singapore (Scentscape Singapore I)* and built on data interpreted in the earlier mapping. I exhibited the sculpture in January 2016 at the RCA Work in Progress show, (Figures 4.18 and 4.19).

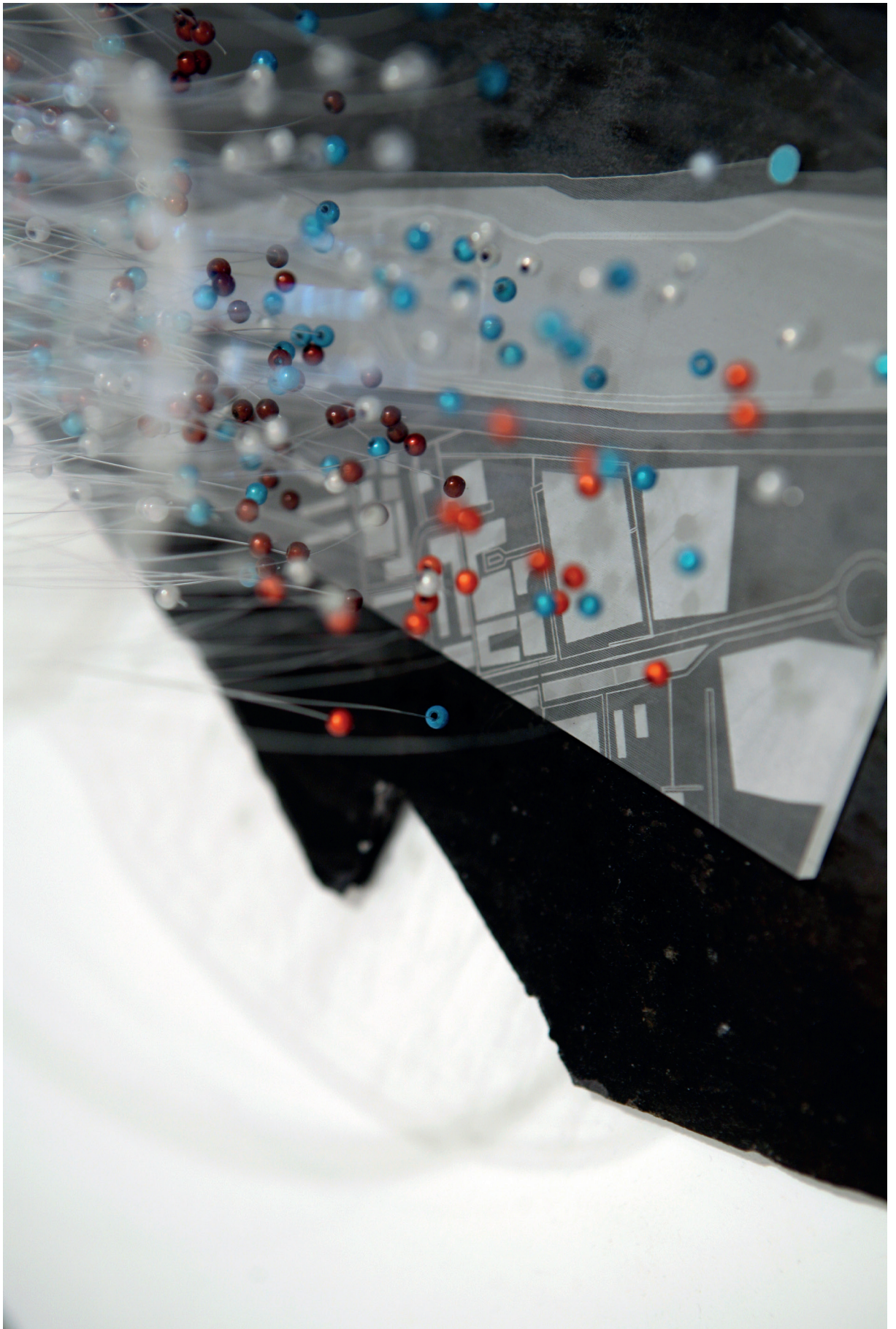
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262 PBS NewsHour, *What a Smell Looks Like*, 2016 <[https://www.youtube.com/watch?time\\_continue=19&v=58U52IDTuvk](https://www.youtube.com/watch?time_continue=19&v=58U52IDTuvk)> [accessed 21 November 2017].





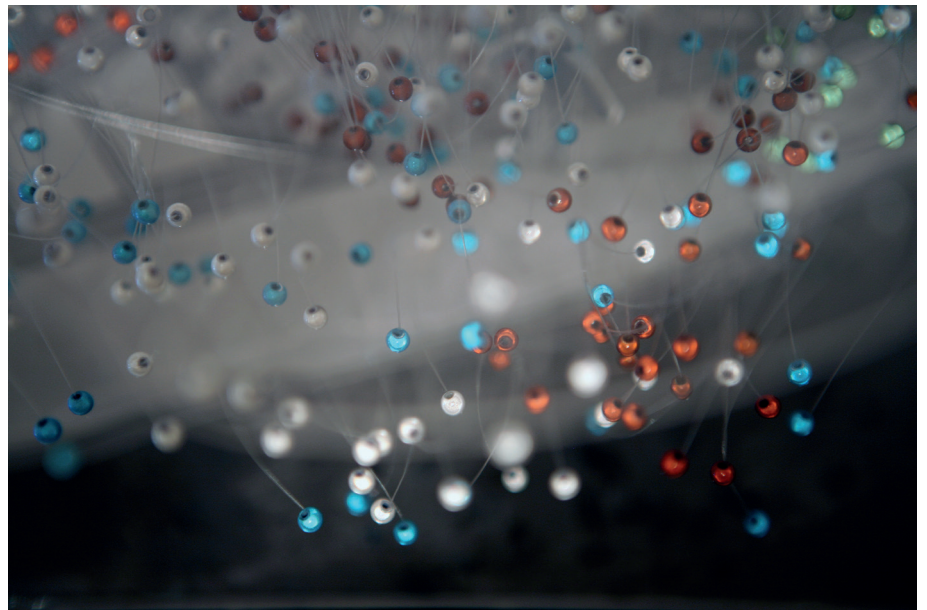
**Figure 4.18:** *Scentscape 06 • 2015 City of Singapore (II) (2015)*. 3D sculpture side view with human form



**Figure 4.19:** *Scentscape 06 • 2015 City of Singapore (II)* (2015). 3D sculpture top view showing etched acrylic base map

The sculpture (Figure 4.18) is a 3D extrusion of the 2D map, whereby the data extends upwards using the datafield of 'duration' as the value for the z-axis. When seen from above, the relative spatial location of any potential smell encounter can be determined in the same way as on the 2D map. Of course, this 3D rendering is an enormous simplification, but I designed it to consider volumetric spatial smell distribution over land and sea, inside buildings, in the streets, in parks and in parking lots (Figure 4.19).

The map's relational capacity connects one dataset with another, "drawing out" new and latent relationships that can be seen amongst the various extracts within the field'.<sup>263</sup> In rendering the smellscape as three-dimensional, attention is focused on the relationship between people and the encompassing physicality of the smellscape. When seen in this way, smells can be understood to surround, bounce off or interact with all parts of the somatic self, acting as potential encounters in dynamic space



**Figure 4.20:** *Scentscape 06 • 2015 City of Singapore (II) (2015)*. Potential smell encounters as a visible content of air, the motion of the beads indicates an unstable understanding of space

(Figure 4.20). Ordinary people walking the streets affect the smellscape of others through emission of our own scents. Our physical trajectories create turbulence, eddies and vortices in the air, in turn shaping where smell molecules might be carried next. The sculpture demonstrates how we are

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263 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 230.

surrounded, even at knee-height, with the potential of a scent encounter. *Scentscape Singapore II* is a prototype for further work in which smell molecules might disperse as people move through a 3D version of the scentscape highlighting the ecological nature of experienced smell. Similar to how medieval Mappa Mundi, works of narrated and illustrated possibility, combine information from science and art, so a scentmap visualises an imagined world.<sup>264</sup>

I created watercolour sketches, 'odours of the morning and evening', in my studio between October 2015 and December 2017. Each is unique; their individuality attests to the diversity of sniffing and recording practice – even when a similar smell is noted, the association, perceived intensity and duration are different. I transcribed smells as watercolour sketches as a design exercise to compare scents of the morning and evening.

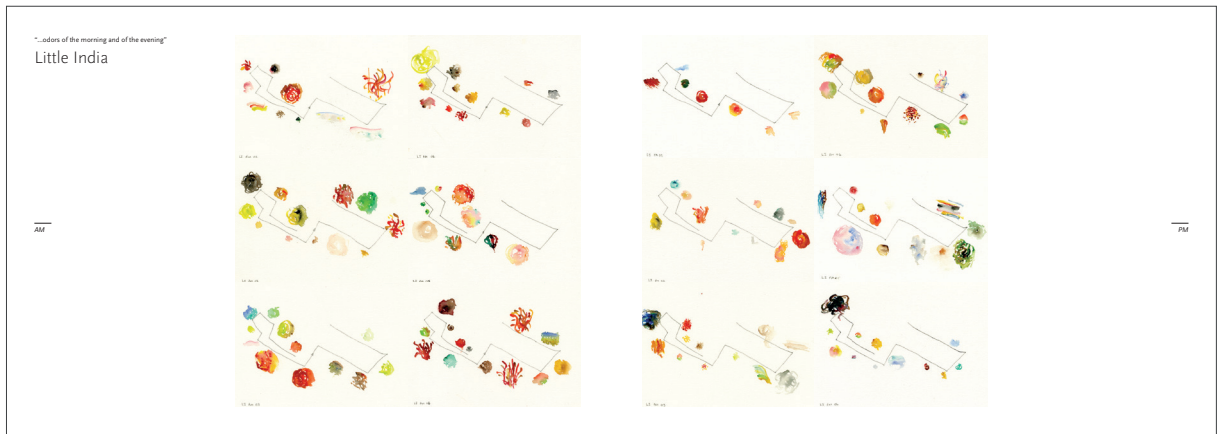
When viewed as small multiples, the painted interpretations of scent data (Figures 4.21 and 4.22) the 'constancy of design puts the emphasis on changes in the data'.<sup>265</sup> Patterns of difference between morning and evening emerged through the smellsketches; in Kampong Glam the night smellscape is more intense and of longer duration (Figure 4.21), whereas in Little India (Figure 4.22) the inverse is the case and is discernible at a glance.



**Figure 4.21:** Scentwalk transcriptions Kampong Glam (2017). Morning scents (left) less intense and shorter duration than scents of the evening (right)

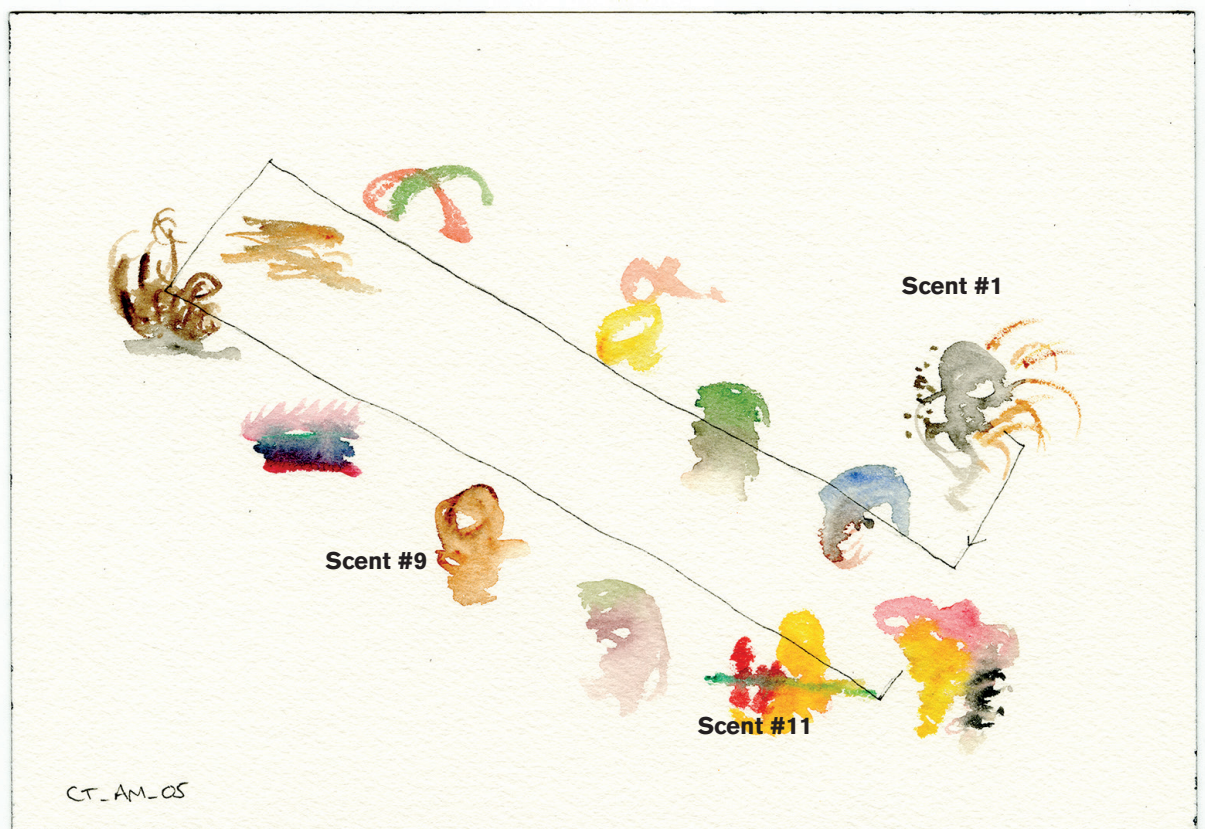
264 West Midlands History, 'Mappa Mundi – A Medieval Vision of the World', *Mappa Mundi – A Medieval Vision of the World* <<http://historywm.com/films/mappa-mundi-a-medieval-vision-of-the-world>> [accessed 15 June 2018].

265 Tufte, p. 68.



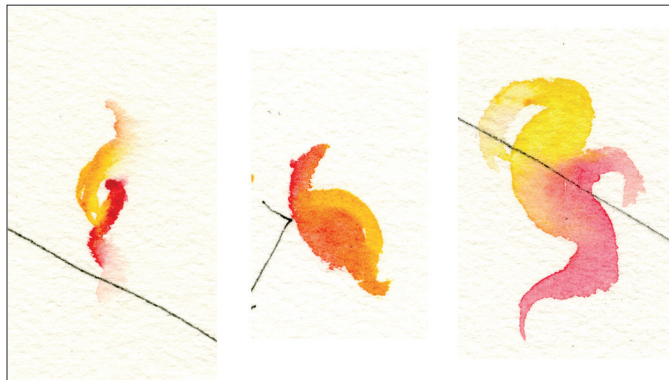
**Figure 4.22:** Scentwalk transcriptions Little India (2017). Morning scents (left) more intense and longer in duration than scents of the evening (right)

A more granular experience, a painted scentwalk based on participant #5's scent notes is displayed in Figure 4.23. Their walk commences explosively with a combination of 'smoke, cigarettes, cardamom and sandal (wood)'. Further along scent #9 derives from a single source, 'sesame oil'. Scent #11 is a complex combination of 'cherry, camphor, menthol and grillfood' depicted using the colour red for cherry, yellow for grillfood as green 'camphor' and 'menthol' cut through the other scents.



**Figure 4.23:** Scentwalk transcriptions from Scentwalker #5 (2017). Morning scentwalk in Chinatown

Compared to the visual aesthetics of previous city smellmaps, as outlined in the literature and practice review (Chapter Two), whereby scents are generalized according to classifications and either reduced to simple colours or hand drawn by individual participants, a single author watercolour approach may be seen to represent the individuality of the smell perception while providing a visual unity.<sup>266</sup> For example, when I developed a symbol for incense (Figure 4.24) I painted intertwining tendrils using a colour scheme to represent the combination of intense perfume and creaminess of the described odour.



**Figure 4.24:** Three versions of scentsketches of incense. Smellsketches, Chinatown (2017). Scentwalker #3 (left), Scentwalker #4 (centre), Scentwalker #5 (right)

Where small multiples of scentwalk sketches permits comparison between individual walkers on the same route, combining the scentwalk sketches into superimposed images represents the richness of collective smell perception. Within this multi-layered image (Figure 4.25), both public and private spaces are brought together through multiple individual perspectives.<sup>267</sup>

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266 Aiello, Schifanella, and Quercia; Jenny Marketou, *Smell It - A Do-It-Yourself Smell Map*, 2008.

267 Lefebvre, *Rhythmanalysis*.

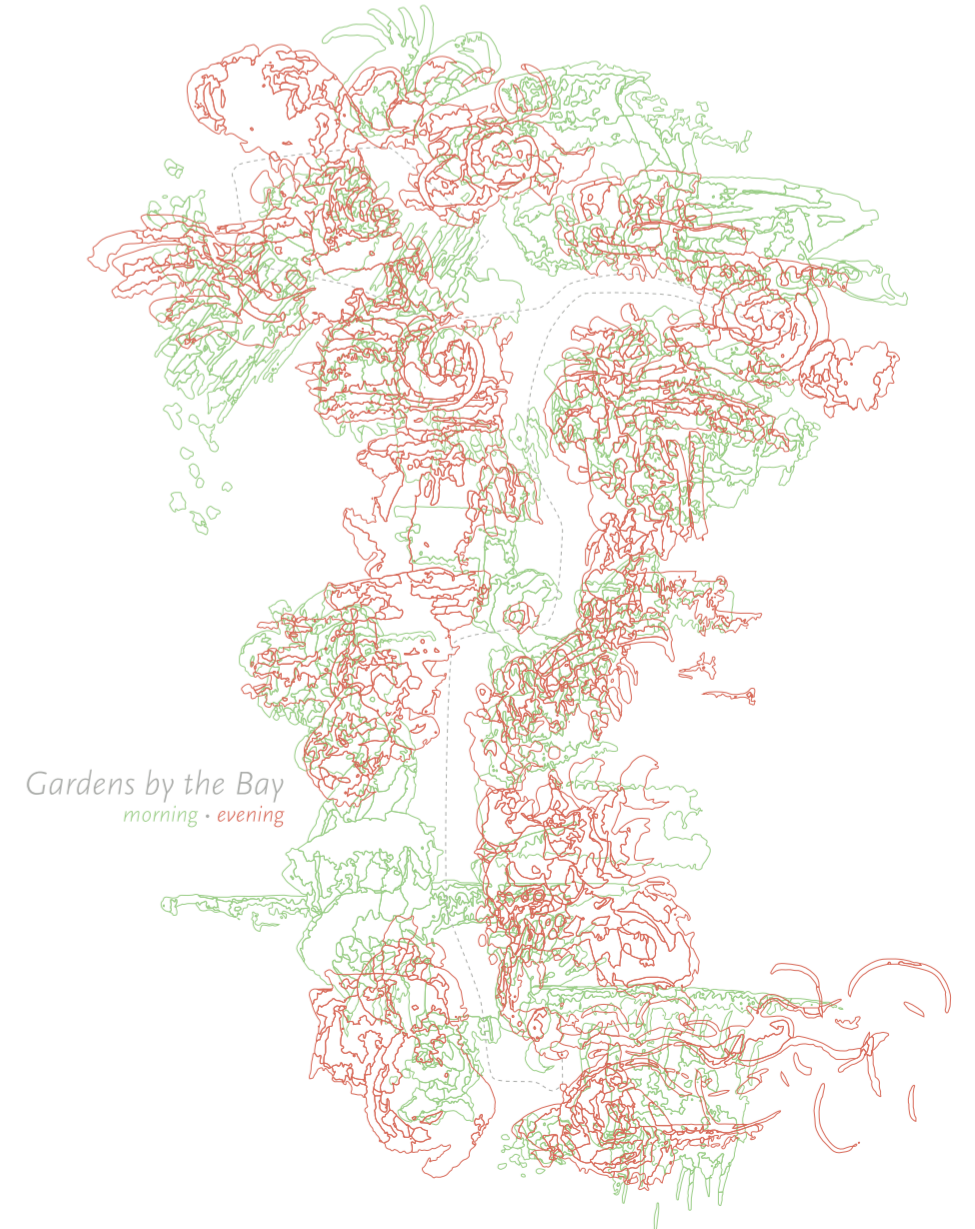
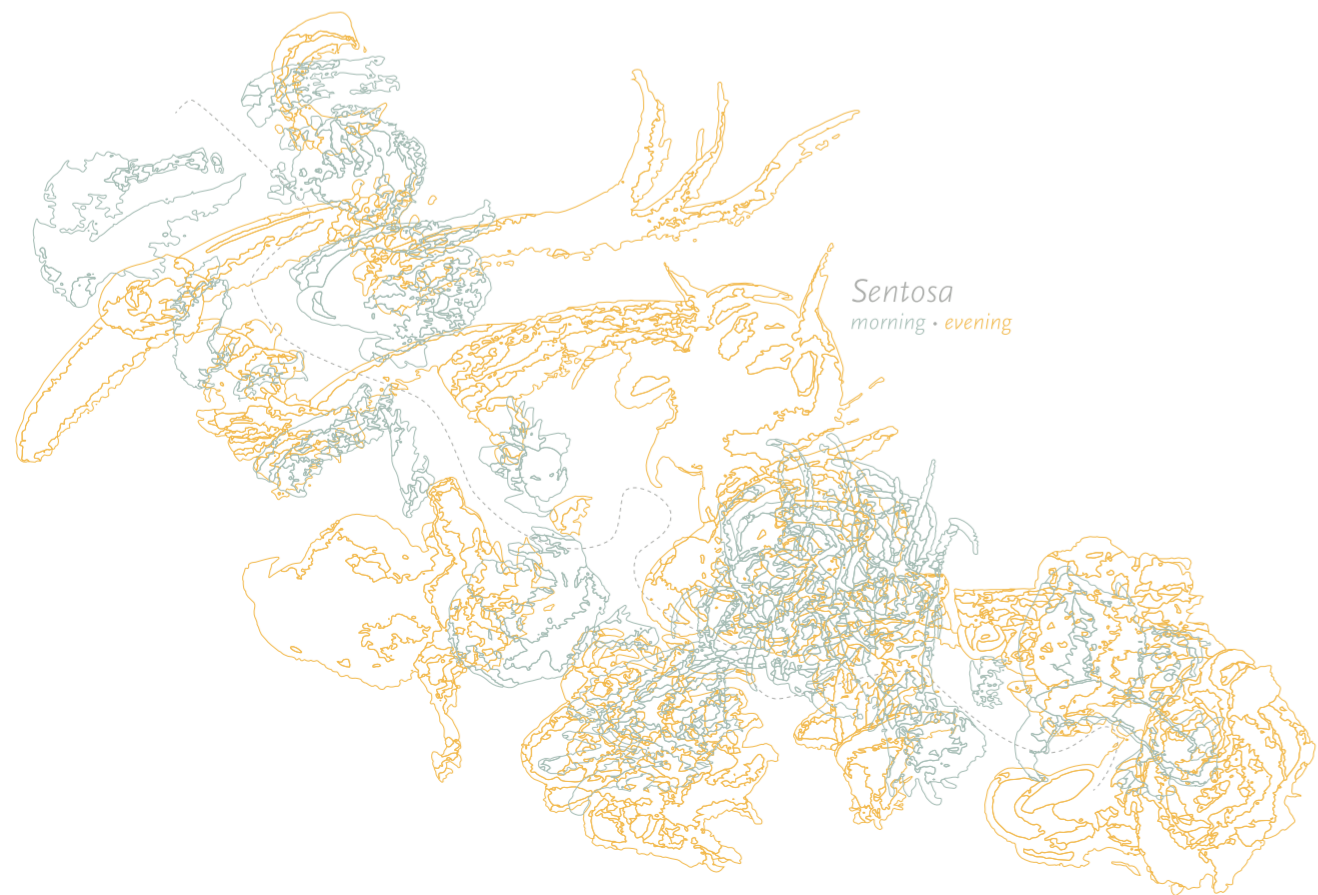
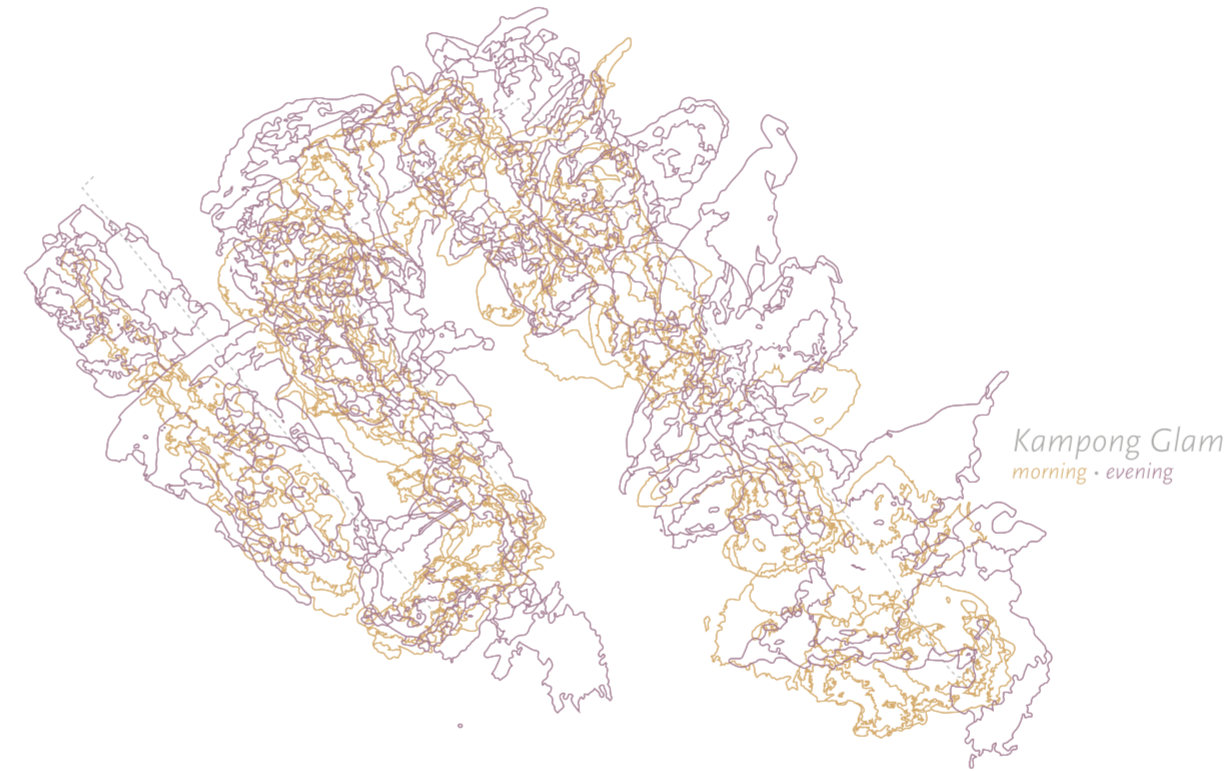
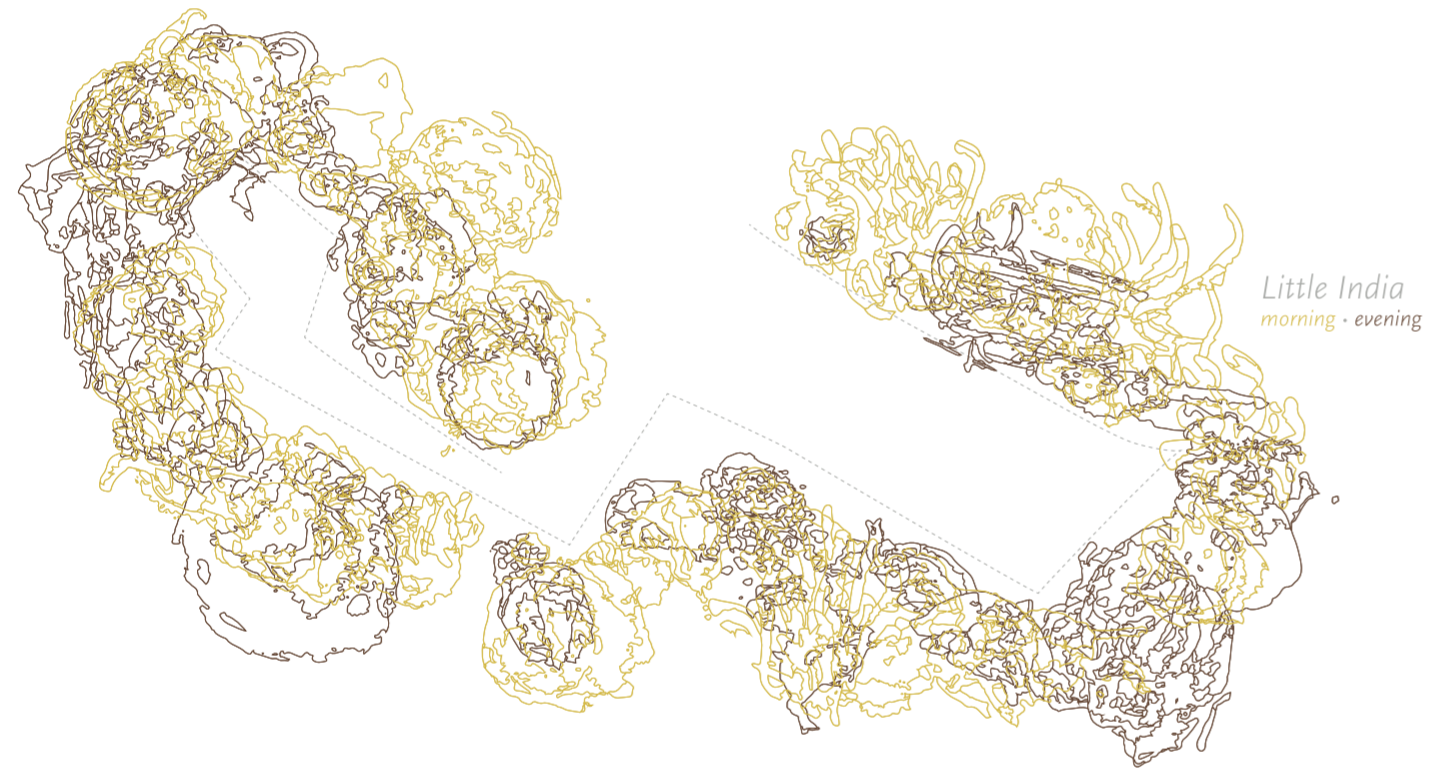
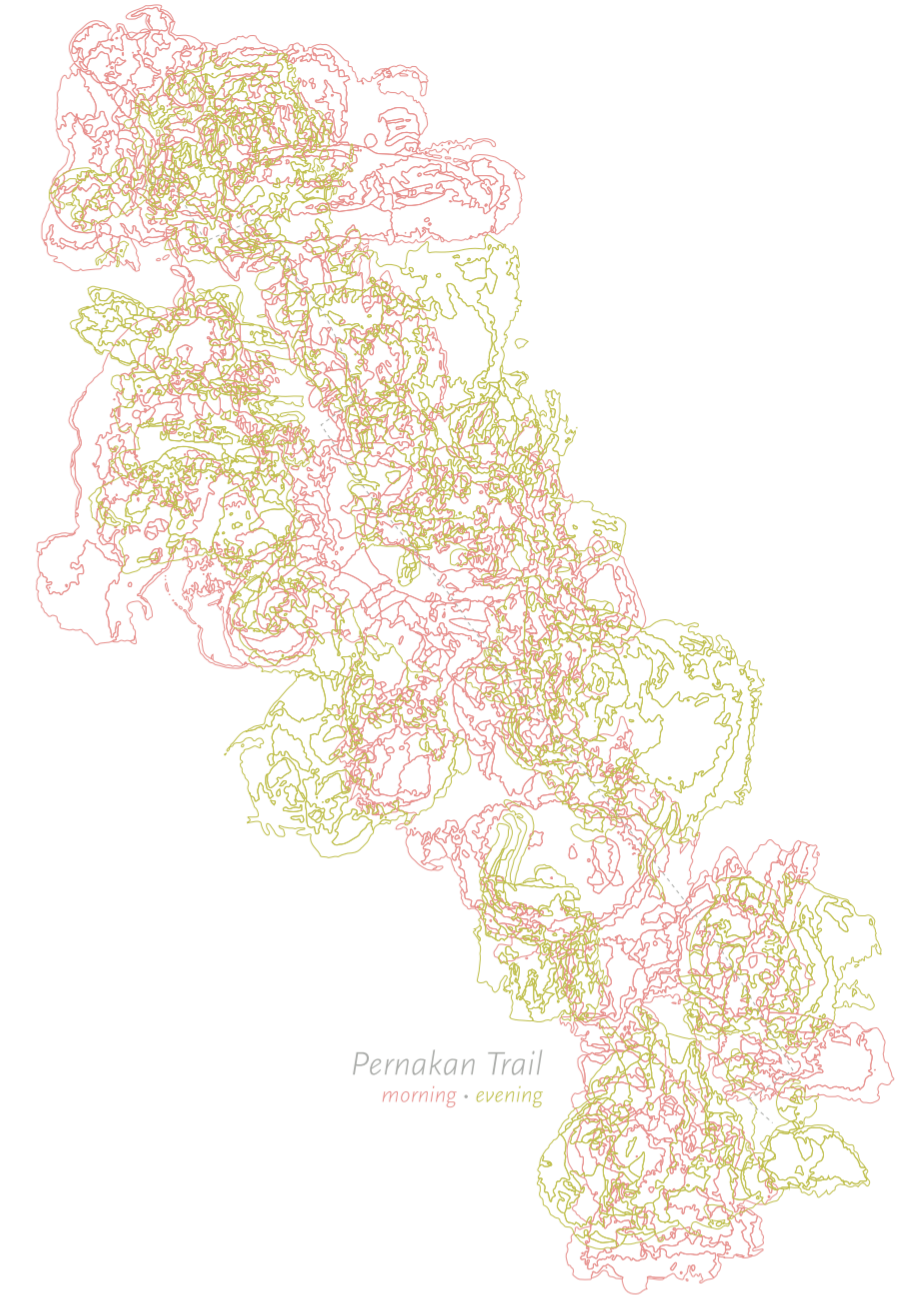
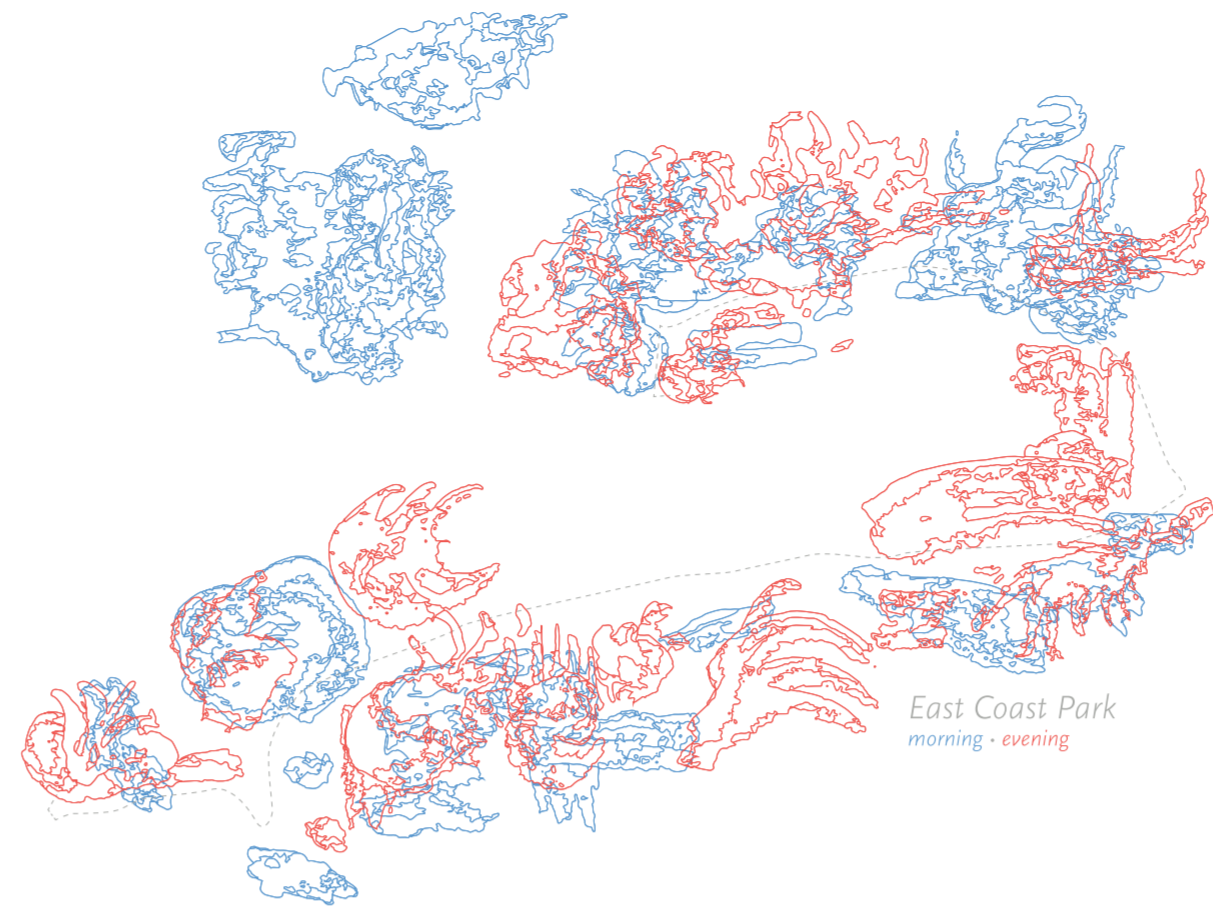
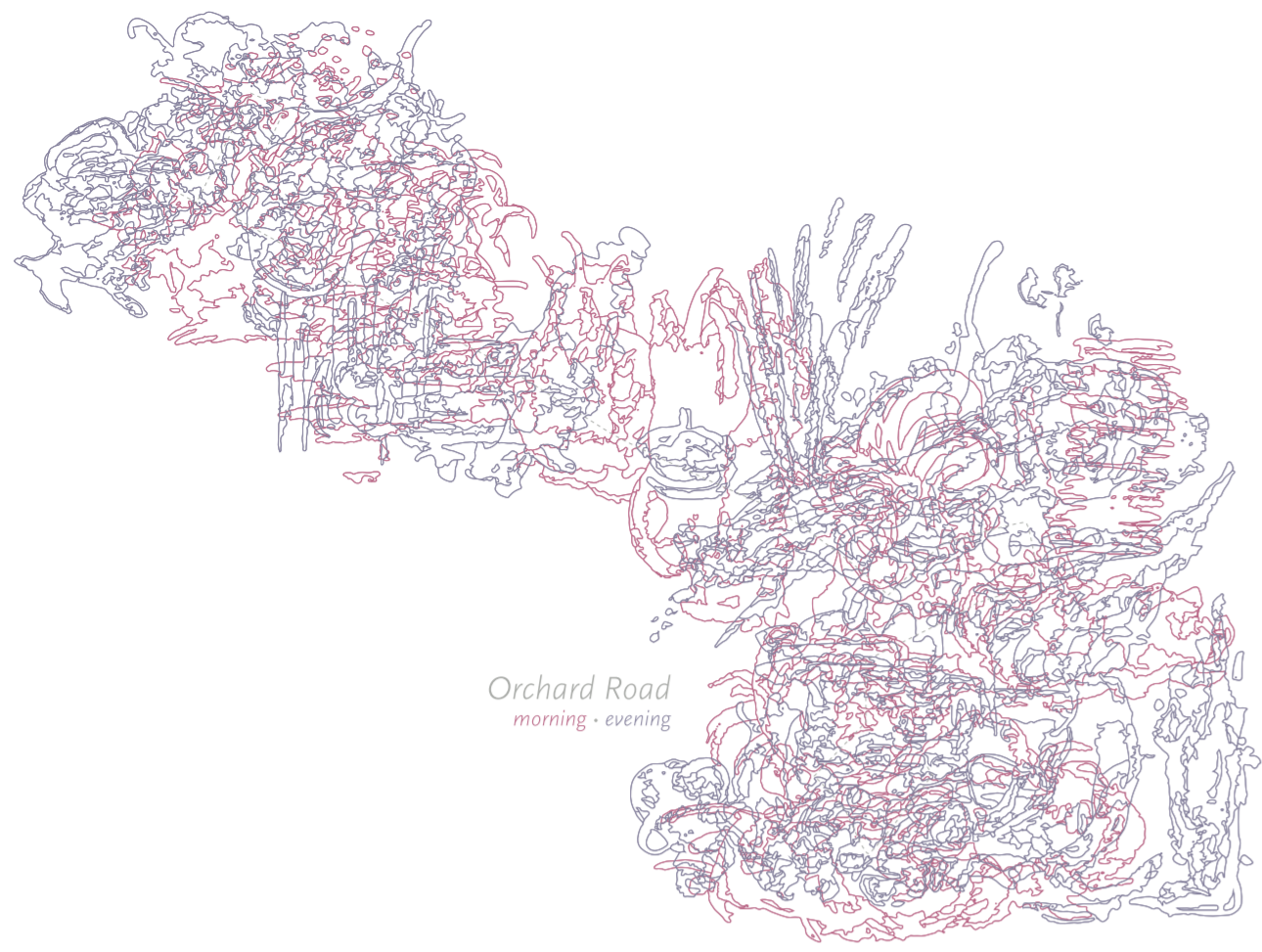


**Figure 4.25:** Combined Smellsketches of scentwalkers #1 – #6, morning scentwalk in Chinatown (2017)

Such layering is common practice in landscape architecture where projected landscaping might be mapped onto existing ground with the goal of simultaneous synthesis and analysis.<sup>268</sup> Further visual analysis, through outlining and spatial superimposition, enables morning and evening scentscape profiles to be clearly discernible in terms of their relative, perceived duration. The resulting layered line drawings (Figure 4.26) provide a different entry-point into the structure of the everyday smellscape. By emphasizing relative duration of smells and aggregating colour from scentwalk paintings it is possible to determine similarities and differences in scentscape interpretation at different times of day, and between different locations. The scentscapes of Chinatown, Peranakan Trail and Orchard Road share similar colour palettes, shape structures and spatial volumes. The ocean-front walks of East Coast Park and Sentosa demonstrate clearer distinctions between night and day through colour and shape respectively. Little India and Gardens by the Bay reveal smell duration to be longer in the morning than the evening; the converse of Kampong Glam.

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268 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'.





These mappings also reveal pulse points of smell duration and periods of constancy. In Little India morning smells have a more constant duration throughout the walk, whereas the evening pulses with distinct moments of lasting smells. The patterns remain open to interpretation, when re-read or followed in-situ they might elicit an idea of smell density in specific neighbourhoods. Mapping the perceived duration of scents highlights their temporal dimension. In the '*odours of the morning and evening*' series, subjectively collected and subjectively represented, scent durations are tethered to a neighbourhood through the map's title and a dotted grey line, an 'itinerant device' indicating the route.<sup>269</sup> Therefore, with local knowledge, this scentwalk could be undertaken anew. Tufte suggests one role of the designer is to find design strategies and reveal complexity – rather than to fault the data for an excess of complication.<sup>270</sup> This highly intimate approach to representation presents the smellscape as a negotiable terrain.

#### 4.6 *Moving from the spatial to the temporal*

In this chapter I have investigated patterns and relationships between the spatial components of the scentscape through a range of mapping practices. This case study examined, through practice, how cartographic forms and processes can be deployed in rendering the spatial elements of the smellscape within a geographic environment. I have also demonstrated how acts and processes of mapping have rendered an imagined eye-invisible world into being.

Smellscape mapping is a form of sensory communication that enables the selection and transformation of sensory information from one medium into another. The above processes of mapping possess the capacity to examine and extrapolate sensory experience of place from multiple viewpoints while highlighting sensory dimensions not normally

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269 Waldheim and Desimini, p. 197.

270 Tufte, p. 53.

considered, such as perceived smell duration. Whilst instrumentally useful to urban designers and architects seeking to communicate sensory experience of projected environments, the different forms of smellscape mapping equally serve an aesthetic audience interested to reconsider their own personal experience. This case study explored the use of adapted cartographic symbols, 3D sculptural forms, smellsketching and layered outline drawings to render the smellscape as eye-visible. The dataset, collected using a qualitative methodology, was interpreted through qualitative methods in order to maintain and reflect human subjectivity. This case study suggests how the uniqueness of a smellscape might emerge from the terminology and colour choices selected by local inhabitants, allowing a glimpse into a collective local knowledge and expertise.

The following case study operates in tandem; focussing on temporalities in place of the spatialities covered in this chapter. I continue to consider strategies to represent a smellscape in continual flux, exploring dynamic intersecting rhythms of human movement and olfactory environments in which the map, as a tool of representation, fulfils a role at once descriptive and suggestive; relaying the perceived and simultaneously conjuring the as yet unimagined.<sup>271</sup>

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271 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention'.

Chapter Five | Case Study 2, Kyiv

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Practices of  
smellscape  
representation:  
multi-scalar  
temporalities

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The previous chapter considered how visual spatialisation of smellscape qualities rendered it as eye-visible and how modified cartographic symbols established relationships between smell and place, smell and space, smell and time. A comparative mapping demonstrated the place-specificity of smellscapes, a sculptural model indicated the volumetric distribution of smells in air and a series of sketches led to closer exploration of the fluctuating nature of smell duration at different times of day. The smellscape is highly temporal, and it is to the fragmented nature of smells in time that I now turn.<sup>272</sup>

The city of Kyiv was the location for the second of my two case studies in which I addressed the temporal dimension of qualitative smellscapes. I combined two complementary methodologies, research-through-design and rhythmanalysis, to investigate how a smellwalk in Kyiv, undertaken by a group of seven local inhabitants, might be temporally analysed through visual practice.<sup>273</sup> The resulting five smellscape mapping strategies afford insights into new relationships; individual instances of smell-time perception, the smellwalk both as a somatic exercise and a collective exercise, and individual smell-environment rhythms. New processes, inventions and extensibility of the research manifests through design praxiology, reflection-in-practice, and reflection-on-practice.<sup>274</sup>

I demonstrate how rhythmanalysis might be a valuable starting point for uncovering complexities of a collectively apprehended smellscape. I also demonstrate how smellwalking can be used to investigate everyday

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272 Porteous.

273 Frayling; Lefebvre, *Rhythmanalysis*.

274 Godin and Zahedi.

olfactory accented pulses and beats, repetitions and fades, the stops, silences, blanks, resummptions and intervals that occur in particular locations at specific moments in time. I am led by my visual representations to consider whether human perception of smells may be more than just markers for other everyday rhythms as indicated by Lefebvre, and instead form their own rhythmic patterns.

Conversations, notes, performance, landscape, photographs and the interplay of theory, practice and analysis of map creation come together to form the basis for five ontogenetic mapping visualisations.<sup>275</sup> In combining diagram, text and photography to present the research I take my lead from Wunderlich's development of a conceptual framework for place-rhythm through analysis of the aesthetics of London's Fitzroy Square and from Simpson's investigations of the space-times of street performance both of which are communicated and argued through photomontage, photo sequences, spectral diagrams and time-lapse photography.<sup>276</sup>

The practice of creatively mapping the smellwalks instigated new questions. As I engaged in the design of one mapping so my actions prompted the conceptualisation and creation of the next mapping, which in turn informed the original. This 'reflection-in-action'<sup>277</sup> attests to the value of iteration within a design methodology.

## 5.1 *Logistics and rationale: Kyiv*

The smellwalk featured in this case study was conducted during the winter of 2016 in Kyiv, Ukraine, which as an urban environment, is full of potential encounters with a variety of smells. Tim Edensor theorises the rhythmic environment of the city as, '[...] a series of different paced and orchestrated

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275 Kitchin and Dodge.

276 Filipa Matos Wunderlich, 'Place-Temporality and Urban Place-Rhythms in Urban Analysis and Design: An Aesthetic Akin to Music', *Journal of Urban Design*, 18.3 (2013), 383–408 (pp. 383–99); Paul Simpson, 'Apprehending Everyday Rhythms: Rhythmanalysis, Time-Lapse Photography, and the Space-Times of Street Performance', *Cultural Geographies*, 19.4 (2012), 423–45.

277 Schon.

mobile rhythms produces a collectively constituted choreography that gives temporal shape to place' and it is this collective choreography of human-smell encounters that provides the material for this serendipitous case study.<sup>278</sup> I have little problem finding research participants either through their interest in smell, data visualisation, or the opportunity to experience their everyday environment through an alternative modality; and Kyiv was no exception.<sup>279</sup> This particular case study is representative of other smellwalks in its structure, and has a small enough sample size (seven participants) to enable a comparative analysis of individual walks. The small number of participants also meant that I could recall and geolocate individual trajectories and specific smell encounters after the smellwalk.

At 1pm on Sunday December 25, 2016 a huddle of warmly-dressed Ukrainian residents clustered outside the main Post Office on Independence Square, Kyiv.<sup>280</sup> It was my ninety-fourth smellwalk, and I had seized the opportunity to witness Kyiv through the noses of its residents. As mentioned previously, local people with city familiarity are central to my research practice; their tacit knowledge of smell sources, anomalies and expectations contribute to both cultural and place-specific perspectives. In a city other than Kyiv the smells would have been different, but the ethos and structure of the method of their detection, remain consistent. Andriy, the smellwalk's convener, collaborated with other participants to suggest a route with stopping places. While I was prepared to conduct the smellwalk in translation through Andriy all the participants spoke English to a high level, which ensured discussion.

Smells play an important role in Lefebvre's rhythmanalysis, as indicators and markers for other urban rhythms.<sup>281</sup> My study models

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278 Tim Edensor, 'Rhythm and Arrhythmia', in *The Routledge Handbook of Mobilities*, ed. by Peter Adey and others (London: Routledge, 2013), pp. 163–71 (p. 167).

279 This smellwalk took place when I was visiting Kyiv. Prior to arriving in the city, a Ukrainian data journalist, Andriy Gazin, contacted me via Twitter to meet up and talk data visualisation. Together we designed a smellwalk that provided the data for this research.

280 Ukraine respects Orthodox Christian holidays, celebrating Christmas on January 6th

281 Lefebvre, *Rhythmanalysis*.

and synthesises the repeated, yet changing, rhythms and beats of the smellscape.<sup>282</sup> To borrow from the human geographer, Edensor, rhythmanalysis is particularly useful ‘for investigating the patterning of a range of multiscale temporalities – calendrical, diurnal and lunar, lifecycle, somatic and mechanical’.<sup>283</sup> The smellscape will be shown to operate at many temporal levels and mapping deployed to reveal such patterns.

Smell is possibly the ultimate repetitive sense; it is through a series of sniffs that we ingest olfactory information in discrete, repeated units to form an overall experience. When Lefebvre describes rhythm as being ‘the placement of notes and their relative lengths’ he could just as easily be talking about the physiological experience of a person smellwalking.<sup>284</sup>

## 5.2 *Rhythms of the smellwalk*

I divided the smellwalk into three sections punctuated by planned stops during which a facilitated conversation elicited each individual's smell findings and comments. Each section varied considerably from my recommended fifteen minute increments. The introduction and Smell Catching lasted forty-nine minutes, the first stop and Smell Hunting lasted sixty-nine minutes, the second stop and Smell Research lasted ten minutes (Figure 5.1) whereupon we went to a local restaurant to sketch and discuss the final section. The extended walk length can be attributed to the collective negotiation of a route (by its participants) in contrast to designer-led smellwalks in which I stipulate more precise routes and timings. This particular walk was more akin to a Debordian psychogeographic wandering, as mentioned by Drobnick, enabling participants to experience the ‘complex sensory matrix that includes the presence of smell’.<sup>285</sup> The route was

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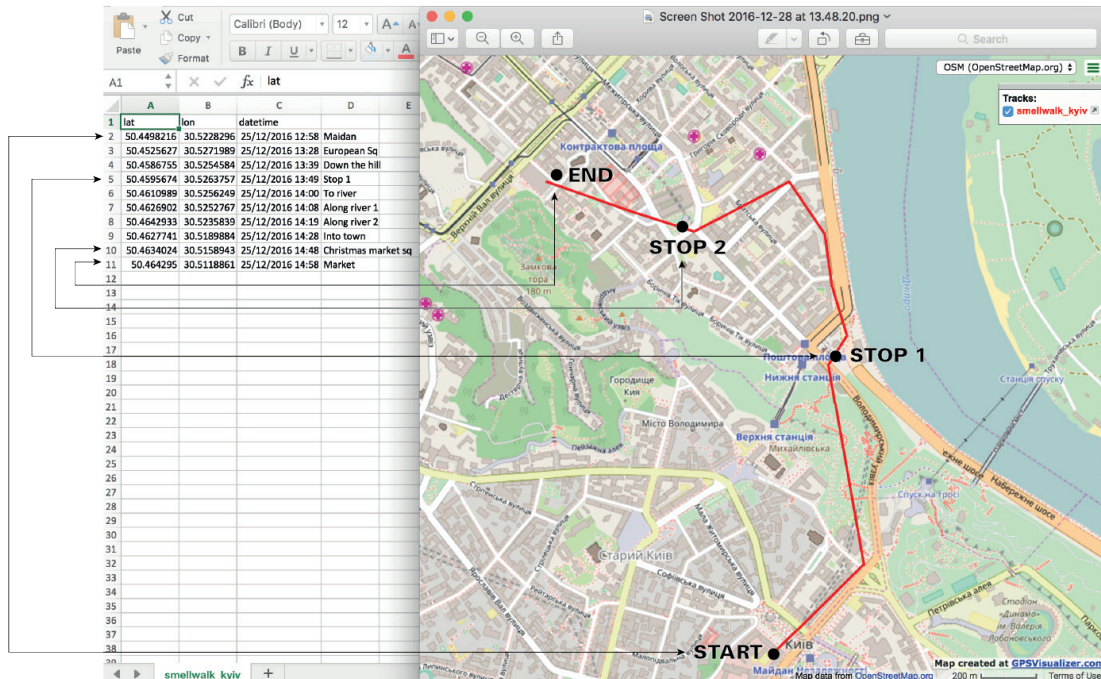
282 Ryan M Moore, ‘The Beat of the City: Lefebvre and Rhythmanalysis’, *Situations: Project of the Radical Imagination*, 5.1 (2013).

283 Tim Edensor, ‘The Rhythms of Tourism’, in *Real Tourism: Practice, Care, and Politics in Contemporary Travel Culture*, ed. by Claudio Minca and Tim Oakes (Routledge, 2012), pp. 54–71 (p. 55).

284 Elden, p. 5.

285 Debord; Drobnick, ‘Toposmia’, p. 35.

negotiated between the smellwalkers who were more familiar with their city than me, the researcher.



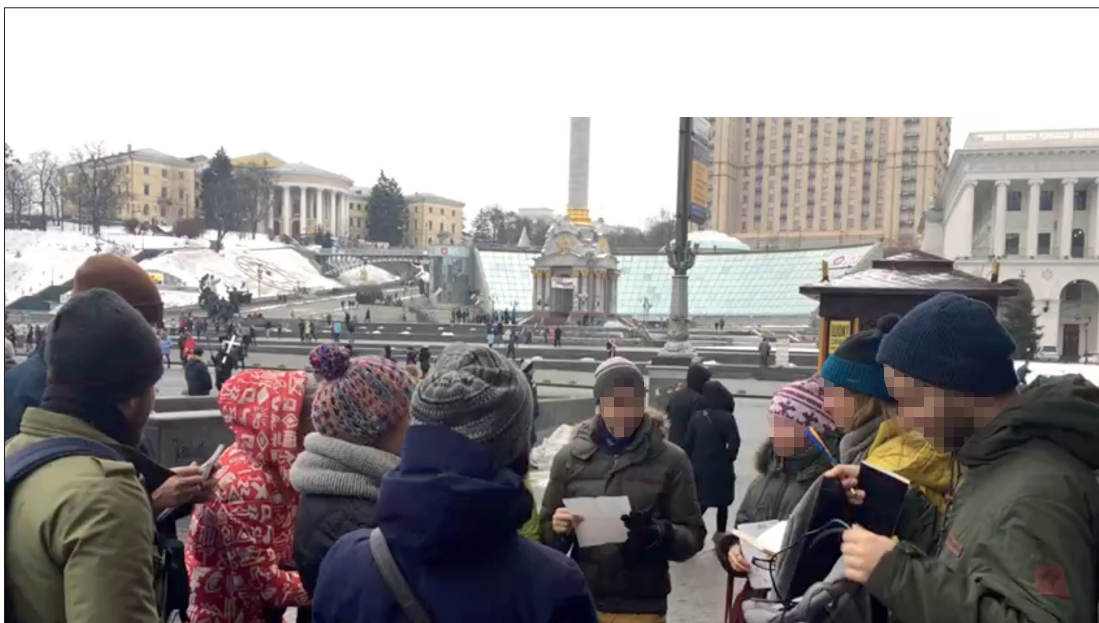
**Figure 5.1:** Smellwalk Kyiv route (2016). GPS coordinates of the smellwalk route recorded by the activity convener and plotted using GPSVisualiser. Dataset courtesy of Andriy Gazin

Following the walk, and prior to creating the mappings, I generated a detailed diary itemising the stages of the walk and bodily movement. The diary forms the basis for understanding how repeated, physical actions enacted during the smellwalk relate to smells. A smellwalker moves both through, and in, space. Comparing the nose (breathing), nose (sniffing), ears, legs, arms, eyes and walking pace reveals inverse correlations between walking speeds and numbers of smells noted. It also suggests how stops, imposed by the walk's tripartite structure, afford more opportunities for smell catching. My overall orchestration of the walk encourages each participant to walk at their own pace while matching that of the group as a whole; in this case the pace varied with accelerations and lingering moments when stopping to sniff. In summary, there was an interweaving of multi-pace trajectories whereby individuals convened in small groups to share sniffing smells before separating to follow odour trails of their own. The physical environments traversed during the route – underground, descents, riverbanks and market interiors combined with



the imposed structure of the smellwalk (catching, hunting, free smelling) to generate unique smell detection body positioning. Smellwalking breaks the monotonous repetition of the commute, shopping and other routine walking practices. The environment has a direct impact on smell encounters since 'walking generates a range of possibilities for putting oneself in an experiential flow while simultaneously maintaining a flow of thoughts'.<sup>286</sup> The following photo series documents the rhythmicity of the smellwalk showing affordances of the environment and human action alongside the smell mentions indicating an interrelation of smell and place.

The smellwalkers gathered, dressed for winter (Figure 5.2), in the expanse of Independence Square where temperatures hovered around freezing.



**Figure 5.2:** Smellwalkers gather (2016). Image courtesy of Tom Bassett

For the Smell Catching activity we walked through Hreshchtyk, Independence Square's subterranean metro access and low-ceilinged underpass filled with vendors and micro-shops selling flowers, clothing and snacks (Figure 5.3) finding a miscellany of smells in confined spaces. Cold rushing winds, at the metro entrances, and warm rushing people mixed,

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286 Tim Edensor, 'Walking in Rhythms: Place, Regulation, Style and the Flow of Experience', *Visual Studies*, 25.1 (2010), 69–79 (p. 72).

creating an indeterminate season. Smells noted verbatim by smellwalkers included: 'Confectioner sugar hot dog water, Rotten egg and mayo, Oil frying (Balfy metro), Cigarette smoke, Scent of women perfumes, Smooth sweet-like doughnuts, Cheap plastic souvenirs which not interesting to touch, Cheap food and coffee, Humidity fresh dampness'. The smell combinations noted were of people, food and transport.



**Figure 5.3:** Smell catching underground (2016). Image courtesy of Tom Bassett

While Smell Hunting along the deserted banks of the river Dneiper the smellwalkers wove paths in and around each other, seeking smell sources. The communal walking pace aligned to a single rhythm until individuals interrupted; we felt secure keeping each other in sight (Figure 5.4). The air was cold. No-one lingered unless it was to explore a potential smell opportunity. Smells recorded verbatim during Smell Hunting included 'Inside light pole – cold steel concrete, wire insulation, Fungus (near river), Fuel and old car, wheels near bus, Rust, Metal'. With the absence of people, the smells were of inanimate structures and machinery.



**Figure 5.4:** Smell hunting – walking as a group, keeping other smellwalkers in sight (2016). Image courtesy of Tom Bassett

The fluidity of our walking movement was interrupted. One smellwalker looked at a corrugated metal structure... he stopped and sniffed, seeking out possible odour sources (Figure 5.5)... his walking pace decreased with an increased sniffing rate as he deliberately sampled odours.<sup>287</sup> Finding nothing of note in this venue he moved on.



**Figure 5.5:** Smellwalker breaks from group to investigate a source (2016). Image courtesy of Tom Bassett

287 Patrick Barkham, 'Being a Beast by Charles Foster Review – the Man Who Ate Worms like a Badger', *The Guardian*, 3 February 2016, section Books <<https://www.theguardian.com/books/2016/feb/03/being-beast-charles-foster-review-man-whoate-worms-like-badger>> [accessed 16 February 2017].

Another smellwalker stopped, her attention attracted by an anomaly while the group continued onwards. She bent to sniff an item on the ground by the river railings (Figure 5.6). Some smells can only be ascertained through deliberate action and proximity. Her body adapted and moved to detect the smell, to verify and, in this case, to physically collect the source of the odour. She engaged in a swift series of actions that did not conform with the group's, creating an arrhythmia 'produced by the distractions and diversions offered by heterogeneous activities and sights'.<sup>288</sup> The two examples above lead me to suggest how both real-time olfactory stimuli, and the imagination of a possible future smell, are diversions that interrupt the rhythm of the group walk and individual pace and movement.



**Figure 5.6:** Smellwalker breaks from group and bends to collect a smell source (2016).  
Image courtesy of Tom Bassett

288 Edensor, 'Walking in Rhythms', p. 73.

A spontaneous behaviour noted during smellwalks is how participants share their smell experiences; at times they seek verification, at others simply desire to pass on a particular odour experience to someone else in the group and occasionally it happens prior to sniffing upon sight of a possible odour source. In the instance shown in Figure 5.7, the group's walking flow was interrupted by the smelly potential of a mailbox, and yet no smell was noted. The bodies and actions of the smellwalkers reinforced an understanding that the smellscape is in a constant state of flux, 'always a relationship, chemical or mechanical between that which gives off (smells) and the individual who smells (or sniffs)'.<sup>289</sup>



**Figure 5.7:** Sharing potential smell at the mailbox (2016). Image courtesy of Tom Bassett

Zhytnyi Market Place, a two-floor mezzanine interior space (Figure 5.8) was half-full of independent vendors. There was an upward shift in temperature by a bare couple of degrees. While a far cry from the potency of a hot, summer city market, the venue afforded plenty of odiferous opportunities; foodstuffs, produce, clothes, drinks, and plants. One pervasive smell, mentioned by several smellwalkers was described as 'damp fur of animals' detected on the ground floor. During the 'Free Smelling' activity inside the market the smellwalking group divided and meandered

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289 Rodaway, p. 71.

at their own pace following their own interests. Recorded smells included: 'Borved coffee with plastic + raw meat, Rosemary, Smth unclean and damp like floor, Fresh strawberries, Dried summer herbs, Tasty smell of cabbage, pickles with adding of vinaigre, Ukrainian salo, Market smells'. Similar to the underground at the start of the walk it was everyday, working activities of people in the space that produced the smells; whiffs of edible produce and those resulting from its preparation, waste by-products, preservation and containment.



**Figure 5.8:** Inside Zhytyni Market for free smelling activity (2016)

One remark during the post-walk conversation was how Zhytyni market presented a complete seasonal cycle under one roof. Smellwalkers listed the following in evidence: herbs of spring, strawberries of summer, pomegranates of autumn and glintwein of winter.

### 5.3 Scales within the smellscape: processes of visualisation

Kitchin et al suggest that a processual understanding of maps as 'mappings', is best understood through the lens of practice examining how maps are produced and consumed in diverse ways 'technically, socially, bodily, aesthetically and politically'.<sup>290</sup> To this end they propose a series of methods through which this might happen. As a mapping practitioner and researcher, I narrate my own unfolding production and present a series of visual mappings of the Kyiv smellwalk to explore how temporal knowledge embedded in the smellscape might be communicated through:

- i. individual instances of smell perception in the form of participant smell sketch graphic elicitations using watercolour paints, *Smell Sketches – Kyiv* (Figure 5.9);<sup>291</sup>
- ii. a visualization of the multiple rhythms involved in aspects of the walk, detail *Pulses of Smell* (Figure 5.10), taken from *A Winter Smellwalk in Kyiv* (Figure 5.11);
- iii. an animation tracing the collective smell detection points and smell intensity indicating temporal rhythm of smell occurrences during the smellwalk, *Taking a Line from its Walk – Kyiv* (available online);<sup>292</sup>
- iv. animations of individual smellwalk trajectories, an investigation of the temporo-spatial experiences of seven smellwalkers including reference to local wind conditions affecting the directional flow of smells, *Smellflow Kyiv I, II, III, IV, V, VI & VII* (available online);<sup>293</sup>

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290 Kitchin, Gleeson, and Dodge.

291 Rosalind Edwards and Janet Holland, *What Is Qualitative Interviewing?* (London: Bloomsbury, 2013).

292 <https://vimeo.com/213713916> – password: linewalk

293 I – <https://vimeo.com/213708419> – password: walk1  
II – <https://vimeo.com/213708796> – password: walk2  
III – <https://vimeo.com/213709054> – password: walk3  
IV – <https://vimeo.com/213709305> – password: walk4  
V – <https://vimeo.com/213709679> – password: walk5  
VI – <https://vimeo.com/213709760> – password: walk6  
VII – <https://vimeo.com/213710044> – password: walk7

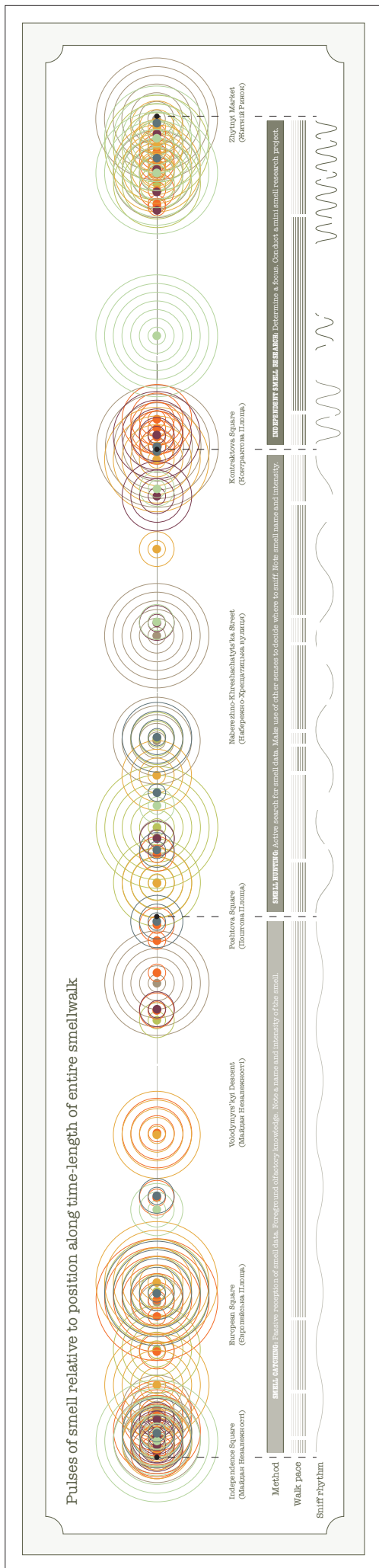
- v. animation of the collective smellwalk experience, in which a polyrhythmia of superimposed smellwalk sequences create new temporo-spatial forms, *Smellscape Mapping – Kyiv* (available online).<sup>294</sup>



**Figure 5.9:** Smell Sketches – Kyiv (2016). Complete set of smell sketches completed by participants immediately following the smellwalk on December 25, 2016

294 <https://vimeo.com/211929457> – password: polyrhythmia





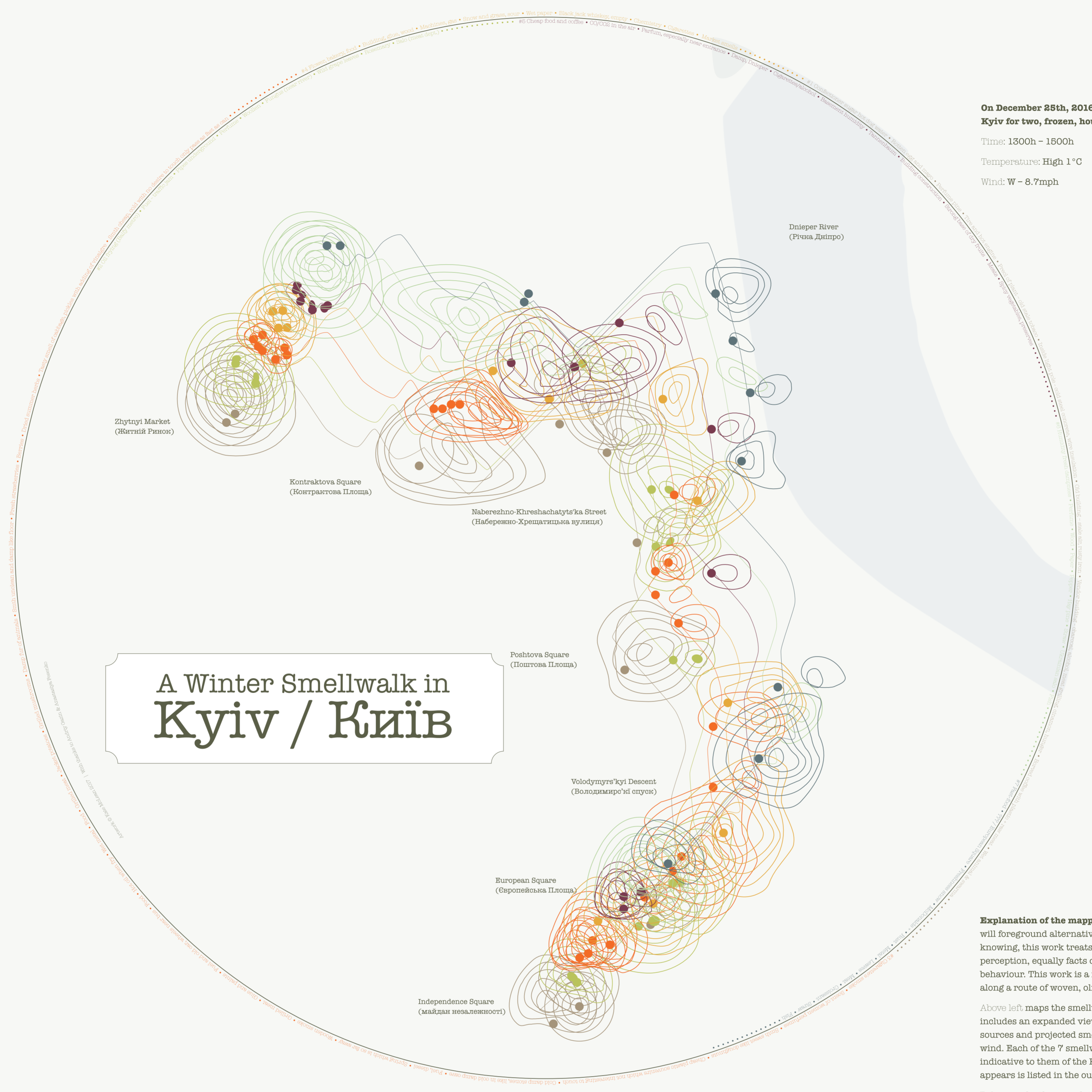
**Figure 5.10:** A Winter Smellwalk in Kyiv (2017).  
 Pulses of smell relative to position along the time-length of the entire walk

On December 25th, 2016 a group of 13 people smellwalked Kyiv for two, frozen, hours.

Time: 1300h - 1500h

Temperature: High 1°C

Wind: W - 8.7mph



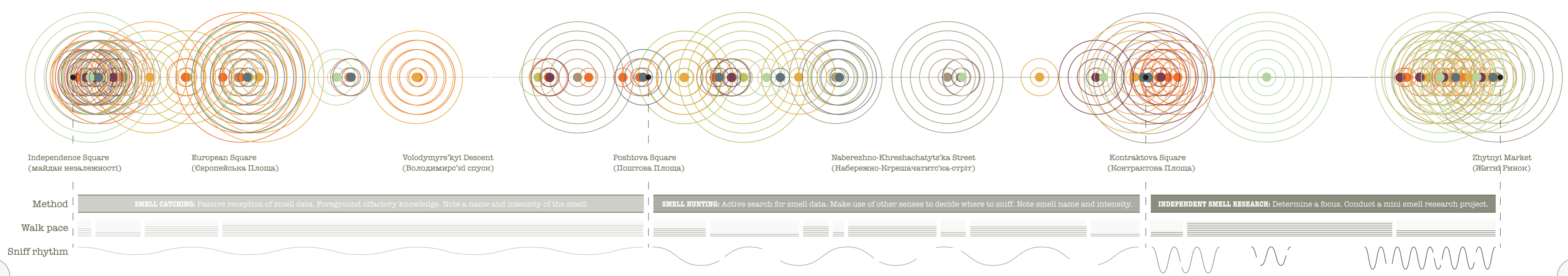
## A Winter Smellwalk in Kyiv / Київ

**Explanation of the mapping:** Speculating that future generations will foreground alternative sensory modalities as ways of knowing, this work treats smells as affordances of visual perception, equally facts of the environment and of human behaviour. This work is a mapping of ephemeral information along a route of woven, olfactory trails.

Above left maps the smellwalk, which started at Maidan, and includes an expanded view of 7 individual trails showing smell sources and projected smell shapes in the light, westerly winter wind. Each of the 7 smellwalkers is represented by a colour indicative to them of the Kyiv smellscape. Every smell that appears is listed in the outer ring of the map.

Below marks the cumulative pulse points of smell detection along the route as it unfolds in space, time, and mode of smelling. Concentrations occur in confined spaces and at stopping points.

### Pulses of smell relative to position along time-length of entire smellwalk



Independence Square (майдан незалежності)    European Square (Європейська Площа)    Volodymyr's'kyi Descent (Володимирівський спуск)    Poshтова Square (Поштова Площа)    Naberezhno-Khreshchatyts'ka Street (Набережно-Хрещатицька вулиця)    Kontraktova Square (Конрактова Площа)    Zhutnyi Market (Житній Ринок)

Method: **SMELL CATCHING:** Passive reception of smell data. Foreground olfactory knowledge. Note a name and intensity of the smell.    **SMELL HUNTING:** Active search for smell data. Make use of other senses to decide where to sniff. Note smell name and intensity.    **INDEPENDENT SMELL RESEARCH:** Determine a focus. Conduct a mini smell research project.

Walk pace: [Bar chart showing varying lengths of bars]

Sniff rhythm: [Wavy lines showing varying frequencies and amplitudes]

The preceding visual outcomes are analysed in Section 5.4. First I consider the multiple somatic rhythms in operation during a smellwalk, particularly how breathing, sniffing, walking and stopping contribute to the overall experience. Rhythmanalysis requires bilateral transition between the lived and the analytical. Lefebvre suggests that 'to grasp a rhythm, it is necessary to have been grasped by it; one must let oneself go, abandon oneself to its duration'.<sup>295</sup> When applied to smell it is beneficial to appreciate and understand the physical rhythms of the body involved in the act of sniffing. Lefebvre continues to state, 'In order to grasp and analyse rhythms it is necessary to get outside them, but not completely.'<sup>296</sup> To analyse smellscape a level of exteriority facilitates the functioning of intellect. My capacity to grasp the rhythms of the smellwalk is drawn from prior experience of ninety-three smellwalks; I have certainly been grasped. As a researcher and practitioner, I found this transition easier when undertaking the more traditional mappings than when creating the smell sketches on behalf of the Singapore scentwalkers (as outlined in Chapter Four, page 123). In the Kyiv case study I undertook practice-led and practice-based analysis after the event, reframing the performances of the smellwalk participants into visual and animated mappings.

The body is key to both rhythmanalysis and to smellwalking. Prior to departure from Independence Square our breathing and hearts were in eurythmia. As the walk commenced so we drew deeper breaths, detecting smells, re-detecting smells, stretching upwards into a breeze, or downwards to ground-level in order to finesse a description through a series of confirmatory sniffs. With these actions breathing and heart rate rhythms changed but eurythmia was maintained as intervals of sniffing superimposed onto regularities of breathing which were themselves modified by the terrain, walking speed, obstacles and temperature (Figure 5.10).

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295 Lefebvre, *Rhythmanalysis*, p. 37.

296 Lefebvre, *Rhythmanalysis*, p. 37.

The smellscape, as perceived by humans, encompasses multiple rhythms.<sup>297</sup> Our inner cyclical rhythmic activity of approximately twenty-four thousand breaths every day not only keeps us alive but is also a mechanism that enables us to ingest smells. However, to smell we still need to sniff deliberately. This conscious action serves to re-attune normal ocular-centric understanding and instead foreground information gleaned from the nose. Breathing is not sniffing; one is a reflex action, the other a conscious act.<sup>298</sup> So, the sniff rhythm changes according to the stage of the walk (Smell Catching, Smell Hunting, Free Smelling), the terrain, levels of physical exertion and the temperature. Smell Catching invokes a measured, deep and regular breathing cycle, whereas Smell Hunting invokes a more regular breathing pattern with irregular deeper sniffs for short periods of time and Free Smelling might incorporate both as the walker chooses. The respiratory rate for humans varies with age but averages out at between twelve and eighteen breaths per minute, or one breath cycle every three to five seconds, a value I use for the duration of smells in the animated sequences.<sup>299</sup>

The following section analyses relationships; the patterns, rhythms and temporalities that emerge from the smellwalk experience in Kyiv.

#### *5.4 Analysing and constructing the smellscape: sketches, symbols, animations*

At the end of the smellwalk, as we were sitting in a restaurant, I asked the participants to create a summary sketch of their smellwalk experience. This served as a communication tool to help describe the highlight of their individual experience to others in the group. Each of the smell sketches alludes to a temporality:

Smellwalker # 5 talked about the olfactory impact of Independence Square's underground space. She termed it an 'asylum'

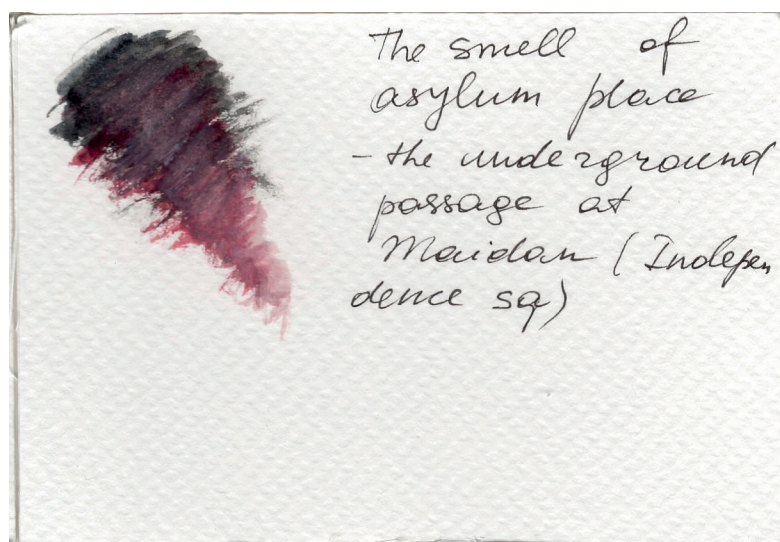
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297 Lefebvre, *Rhythmanalysis*.

298 Alexandra Horowitz, *Being a Dog: Following the Dog Into a World of Smell* (New York: Scribner Book Company, 2016), p. 38.

299 Kim E. Barrett, *Ganong's Review of Medical Physiology*, 24th Edition, (New York: McGraw-Hill Medical, 2012), p. 619.

alluding to a multi-sensory environment of chaos and painted this experience as a tornado swirl releasing trails in its activity (Figure 5.12). The smell visualisation indicates a powerful mass, a combination of smells constrained in a form by its own velocity, with a seeming capacity to strike anywhere. The colours are dirty, even grimy, with a dark value and mid to weak chroma, reflecting the comments in her smellnotes for this section; 'Cheap food and coffee • CO/CO<sub>2</sub> in the air • Parfum, especially near entrance'.<sup>300</sup> I interpret the black/grey to be read as coffee and CO, and the adulterated pink hue as cheap perfume based on patterns of ascribing colour to smell and previous personal experience whereby smell colour equates to the colour of its source; in this case coffee is dark and perfume packaging is frequently pink. The visual environmental context of the walk of a very grey day, as seen in photographs Figures 5.2 – 5.8 may equally influence chroma and hue of smell representation. The powerful and dimensional vortex indicates a spiralling cacophony of vaguely unpleasant smells which have collided in a funnelling mass. The representation references coffee; a repeated and a diurnal activity which prompted further questions as to the annual and seasonal patterns of drink sales. The 'parfum' may have emanated from a vendor, a single passerby, or many people walking through the space, and so be considered as either episodic or ephemeral in terms of its tenacity.<sup>301</sup>

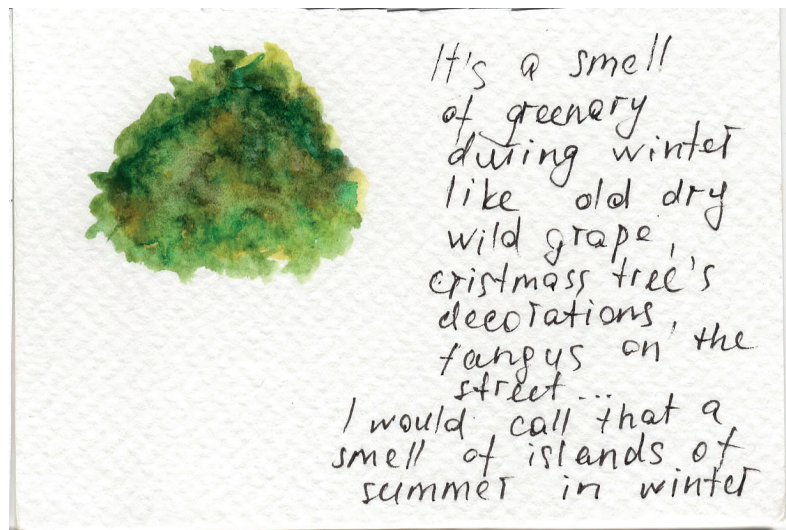


**Figure 5.12:** Smellsketch (2016). A subterranean environment. Smellwalker #5

300 Munsell Color, 'Munsell Color Notation & Color Test; Dimensions of Color', *Munsell Color System; Color Matching from Munsell Color Company*, 2011 <<http://munsell.com/about-munsell-color/how-color-notation-works/>> [accessed 10 March 2017].

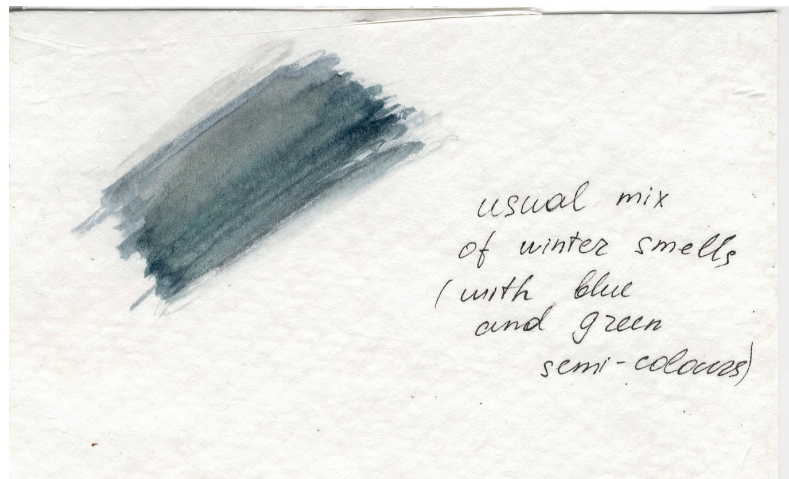
301 Henshaw, *Urban Smellscapes*.

Smellwalker #2 selected her memorable smell of 'Fungus (near river)' in the smellnote and 'fungus on the street' in her smellsketch, writing 'I would call that a smell of islands of summer in winter' (Figure 5.13). She visualised this as a seasonal exchange in which a vibrant colour scheme is at odds with the colours of the landscape in which the smell itself was noted. This is a cyclical and seasonal smell reference as summer momentarily manifested itself through a smell sniffed on the paved walkway. This composite smell encompasses a range of 'greenery during winter' sources.



**Figure 5.13:** Smellsketch (2016). '[...] greenery during winter [...]': Smellwalker #2

Smellwalker #7 consolidated the smellwalk experience into a single visual creating a smellsketch of an entire season (Figure 5.14). The writing clearly suggests the idea of a repetitive and seasonal winter smellscape; the term 'usual mix' contributes a layer of expectation and a shared understanding to her definition. The colour appears to reflect the colour of winter skies with 'blue and green semi-colours'. Her smellnotes of 'Fast-food • European Square • Freshness snow • McDonalds + • Rust • Metal • Leaves • Meat • Croissant • Straw • Fish' indicate a broad mix of environmental, food, and traffic-related urban smells.



**Figure 5.14:** Smellsketch (2016). 'Usual mix of winter smells [...]. Smellwalker #7

Smellwalker #6 selected his memorable smell as that of 'pine tree' (Figure 5.15). Subsequent conversation with him and other smellwalkers indicated the ubiquity of the species that covers 34% of Ukraine's forest landscape and is also common within the city, notably along Volodymyrs'kyi Descent from European Square to the Dnieper River.<sup>302</sup> Pine is a resinous evergreen whose fresh smell is a permanent, background feature of the Kyiv smellscape.



**Figure 5.15:** Smellsketch (2016). '[...] pine tree! Smellwalker #6

302 Internet Encyclopedia of Ukraine, 'Pine', 2001 <<http://www.encyclopediaofukraine.com/display.asp?linkpath=pages%5CP%5C1%5CPine.htm>> [accessed 10 March 2017].

Smellwalker #3 noted far more smells overall than any other participant, most of which were low intensity, but the overriding smell was encapsulated as a momentary counterpoint of 'clear scent of strawberries' against a background of 'like wet animal fur', visualised as a mist or fog that is punctuated with something fresh and vibrant (Figure 5.16). The smellscape is shown to have punctuation points in antithesis to the constancy of the background.

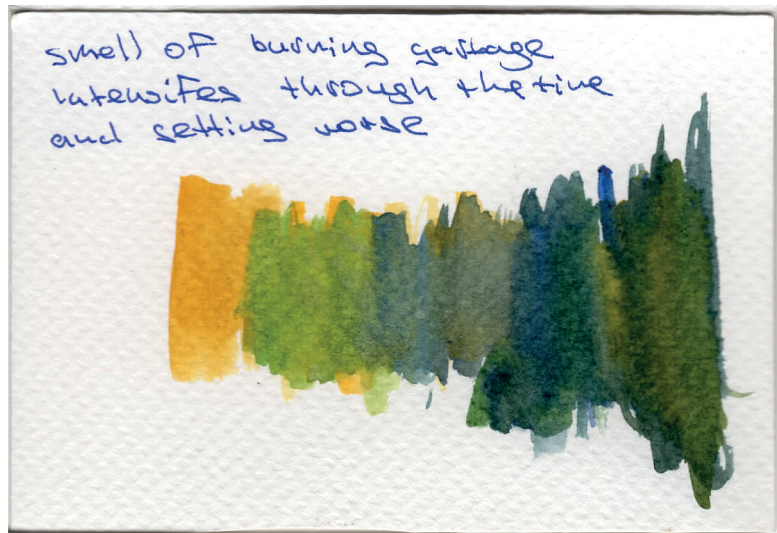


**Figure 5.16:** Smellsketch (2016). A moment in the indoor market. Smellwalker #3

Smellwalker #4 deviated from the smellwalk experience to delineate a progressive, worsening and invasive smell that is affecting some of the city's population. Ukraine incinerates garbage at two sites, in Dnepropetrovsk and Kyiv. These sites were built in the 1980s and reportedly, in 2015, 'their resources are almost worked out'.<sup>303</sup> This smellwalker asked friends and co-workers in advance of the smellwalk about a typical Kyiv smell. Based on their responses he chose to call attention to the garbage treatment plants in his smellsketch (Figure 5.17). The increasingly pungent, negatively-perceived smell has been building for over two decades as he writes, 'the smell of burning garbage intensifies through the time and getting worse'. The sketch is read from left to right as the initial smell becomes both darker in value and larger in size.

303 Vladislav Vorotnikov, 'Will Ukraine Ever Come Clean?', 2015 <<http://www.recyclingwasteworld.co.uk/in-depth-article/will-ukraine-ever-come-clean/84996/>> [accessed 10 March 2017].





**Figure 5.17:** Smellsketch (2016). Indicating a progressive and invasive negative smell. Smellwalker #4

Smellwalker #1 depicted a location-specific smell, the abandoned building's window casing was a repository for the combination of stale air and rusty metal. Visualised with a rusty brown hue overlaid by grey, black and deep maroon this smell representation is an abstract shape with a sharp, hooked peak (possibly a top note) and a widening base. The colours appear to refer to the context and the environment; a brick building on a particularly grey winter's day.



**Figure 5.18:** Smellsketch (2016). Indicating a complex, background, location-specific smell. Smellwalker #1

The above visuals are testament to the multi-scalar temporalities conjured through smell knowledge gleaned on a single walk through the city, demonstrating both a knowledge that derives from smell and the possibilities inherent in relating smell to place through the human body input via the nose and output as olfactory experience artworks.

As I suggested in Chapter Two, many maps of smell can be problematised as follows:

- they neglect to take account of the temporal nature of smell experience;
- they neglect consideration of alternative angles of view often using a mimetic, scientific cartographic paradigm whereby the map's angle of view is typically bird's eye; a top-down, empirical, all-seeing, recording of visualised objects as theorised in Haraway's 'god-trick' and De Certeau's 'totalising view'.<sup>304</sup>

In representing an ephemeral and transient olfactory world as a smellmap the resulting artefact summarises a temporary state only milliseconds in length. In this it is similar to an Impressionist painter's rendering of light whereby the subject remains static but the visual sensations change constantly. Since my research understands walking and smelling as down-to-earth – embodied physical activities undertaken at street level – I now turn to my experiments exploring potential for alternative mappings to address these concerns.<sup>305</sup>

In *A Winter Smellwalk in Kyiv* (Figure 5.11) I compare rhythms of the smells detected during the smellwalk and expose relational connections between the seven participants, the timing and intensity of their smell observations and the somatic components of the smellwalk experience. I employ olfactory symbolisation and glyphs developed within my own practice (Chapter Four, page 116) whereby each smell detection is symbolised with a location dot and a multi-contour symbol to represent the

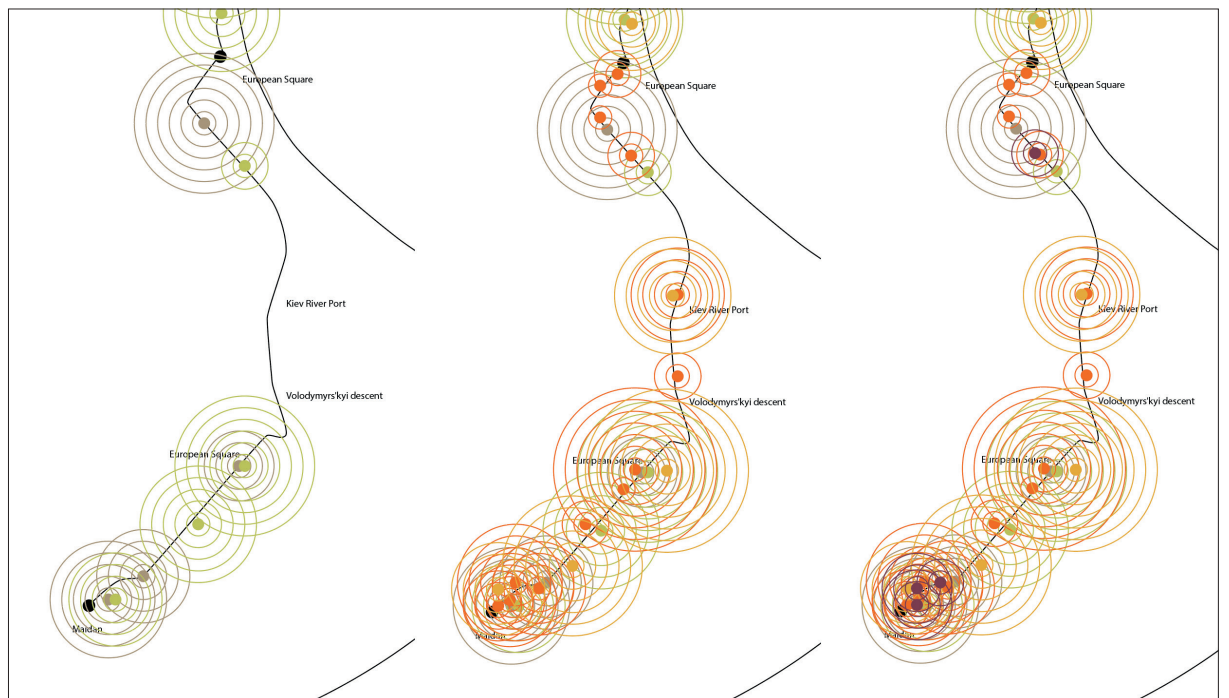
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304 Haraway, p. 581; Michel de Certeau, *The Practice of Everyday Life*, 3rd revised edition (Berkeley and Los Angeles, California: University of California Press, 2011), p. 92.

305 Certeau, p. 93; Melanie McBride and Jason Nolan, 'Situating Olfactory Literacies', in *Designing with Smell: Practices, Techniques and Challenges*, ed. by Victoria Henshaw and others (Routledge, 2017), pp. 187–95.

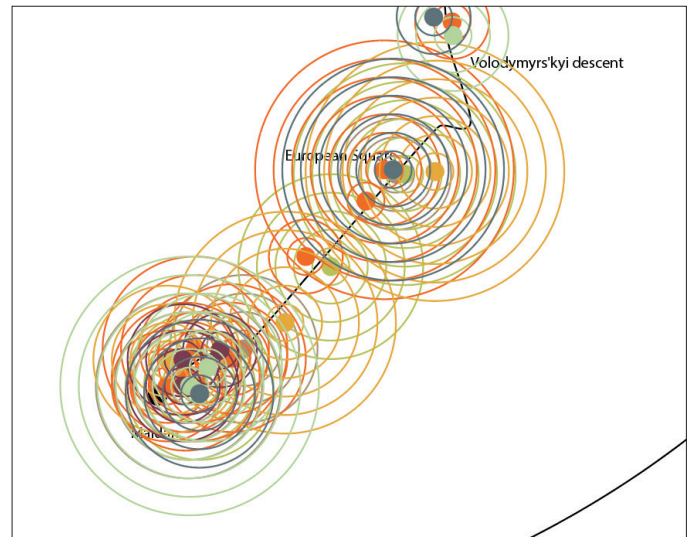
qualitative smell intensity as assessed by the smellwalker. All smellwalkers started at the same location and followed a similar route, although minor individual deviations occurred. Without geolocation technology, I used my own discretion and memory of the walk to position smell sources on a base-map according to the participant's written description e.g. 'Confectioner sugar hot dog water' (Smellwalker #1) is directly attributable to the subway under Independence Square, just as 'Ukrainian salo' (Smellwalker #7) was experienced in Zhytniy Market at the end of the walk. I chose a colour for the smell notes of each smellwalker based on their smell sketches (Figures 5.12 to 5.18).

Patterns emerged from the transcription of individual smell narratives into visual symbols (Figure 5.19). Pulses of collective smell detection can be seen as hot spots interspersed with olfactory voids. The surge of smell detection at the start of the walk might be attributed to a novel method of engaging with the world of smell as well as a rich olfactory environment and the warmth of the busy underpass.



**Figure 5.19:** *A Winter Smellwalk in Kyiv (2017)*. Layering smell narratives on top of one another

**Figure 5.20:** *A Winter Smellwalk in Kyiv (2017).*  
Polyrhythms: olfactory contradictions  
and corroborations



The visual vibration at the start of the trail of slightly offset concentric rings indicates a mass of olfactory source stimuli. This visual cacophony of smell detection in the Independence Square underpass (Figure 5.20) exhibits both contradictions (arrhythmias) and corroborations (eurythmias) which are echoed by the text descriptions from each smellwalker. In turn this prompts questions as to the similarity and diversity of smell detection and its semantic labelling; does 'cheap food' equate to 'fast food'? Is there a relationship between 'sweet doughnuts' and 'rotten egg'? Is the scent of 'cheap plastic souvenir smells' as far removed from that of 'perfume' as the words might indicate? Smells such as coffee, hot dogs and flowers are episodic in time and can connect us to a diurnal cycle of social human movement. The aromas of coffee will vary according to the numbers of passing consumers, the day of the week and the time of day. The hot dog and flower stalls will experience peaks in activity affecting their volatile release of odours into airspace. When visualised thus, localised olfactory potential is a vibrant pulsation of smell instances, which are not permanent inscriptions; their concentration dissipates according to air currents, temperature and the odour source itself.<sup>306</sup> This temporal

306 Kenneth B Kephart and Robert E Mikesell, *Manure Odors* (Department of Dairy and Animal Science: Pennsylvania State University, 1 November 2000), pp. 1–11; Publié par Raymond Porter, 'How to Model Odor Dispersion', *Odotech*, 2013 <<http://www.odotech.com/en/model-odor-dispersion/>> [accessed 17 March 2017].

environment of smells might be visually conceived either as odour plumes, as indicated in Chapter Four (see page 134), or through time-based media as explained in the following sections.

In considering the fluidity of smell movement in airspace this thesis looks to meteorology at a basic level. Airborne smell molecules are subject to airflows, themselves affected by a combination of the natural landscape, the built environment and changes in atmospheric pressure. Wind patterns are continually subject to change on a massive scale and airflows experienced on the ground during a smellwalk are similarly subject to global fluctuations.<sup>307</sup> At an intimate scale, acts of walking, turning, bending and stopping modify localised airflows.

Initial smell detections in Kyiv occurred in the subterranean underpass where air movement at the entry and exit points was stronger (a temperature change generated convection currents as air moved away from a warm space into a colder one). At the centre of the low-ceilinged underpass, eddies formed as turbulence was generated by the heat and movement of vendors, mobile human traffic and food outlets. The bulk of the walk, from Independence Square to Zhytniy Market, took place outdoors, along the banks of a semi-frozen river and through streets largely bereft of any traffic, in a light westerly wind which carried volatile smell molecules with it. The final section of the walk took place at a farmers' market in a cold, dank, two-storey mezzanine building. The building enabled most smells to move freely but still the smellwalkers noticed a damp, unpleasant, pervasive background aroma into which other, more pleasant, smells pierced fleetingly. The challenge was how to map this movement alluding to the meteorological while maintaining subjectivity of individual experience.

The composite design of smell symbols, as discussed in Chapter Four, suggests both the sources of smells and the range of their likely encounter. To account for the contributory air movement in Kyiv, as described above, I manipulated the smell symbols according to the places

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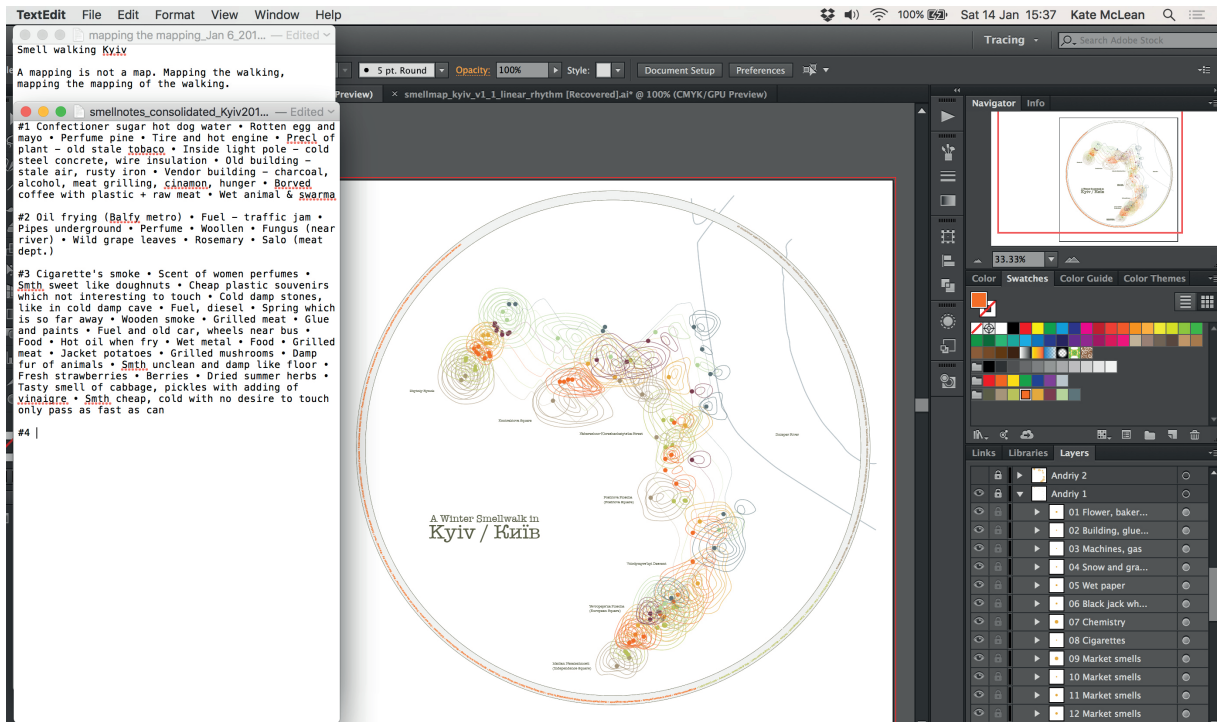
307 H. H. Lamb, 'Our Understanding of the Global Wind Circulation and Climatic Variations', *Bird Study*, 22.3 (1975), 121–41.

in which they were noted; smells encountered along the river Dneiper thus drift eastwards whereas the subterranean Independence Square and Zhytniy Market smells circulate (Figure 5.11). While air currents affect smell trajectories, the activity at the source of each smell can also be instrumental to their propulsion; molecules from hot glintwine and freshly-made coffee volatilise as visible steam carries odours as it rises. In future smellscape mappings it may be possible to combine modelling algorithms of meteorology with those of fluid dynamics to generate the visuals for an imagined 4D smellscape.

To create the map (Figure 5.21), I transitioned between the smellnotes and design software. I typeset smell descriptions in the circular border of the map to draw attention to the everydayness of free, publicly accessible information of smells and in so doing demonstrate how non-specialists might contribute to future olfactory mappings. As contemporary trends for advertising and marketing urban scenting practices develop it is important to demonstrate how smell detection is definitively not an exclusive or specialist activity, despite the secrecy surrounding its commercial synthesis and fabrication.<sup>308</sup>

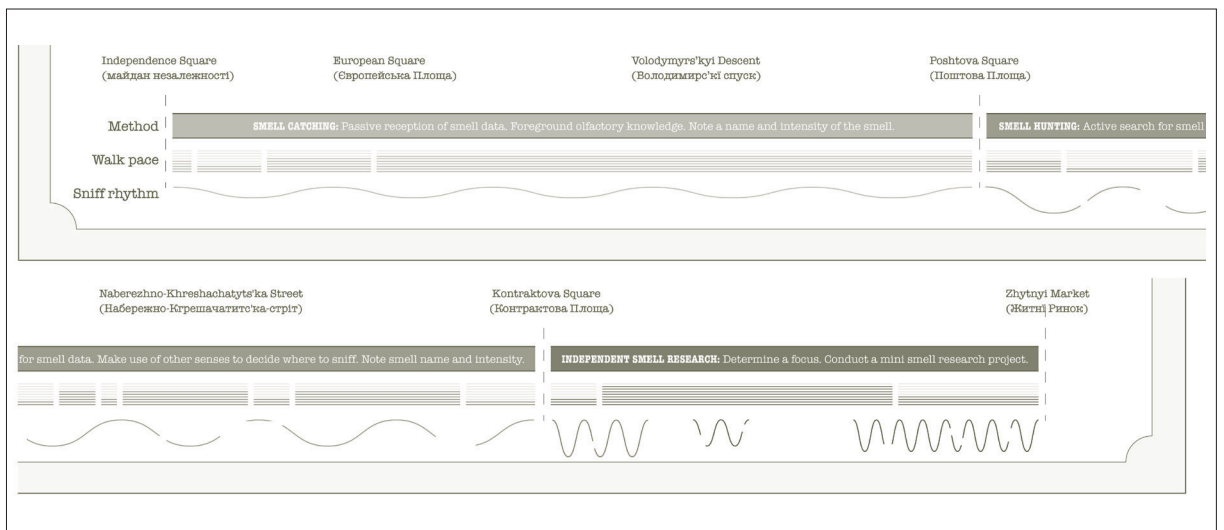
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308 Barry J. Davies, Dion Kooijman, and Philippa Ward, 'The Sweet Smell of Success: Olfaction in Retailing', *Journal of Marketing Management*, 19.5–6 (2003), 611–27; Hal Hodson, 'Smell-o-Vision Screens Let You Really Smell the Coffee', *New Scientist*, 2013 <<https://www.newscientist.com/article/mg21729105-900-smell-o-vision-screens-let-you-really-smell-the-coffee/>> [accessed 14 May 2017]; Victoria Henshaw, Dominic Medway, Gary Warnaby, and others, 'Marketing the "City of Smells"', *Marketing Theory*, 16.2 (2016), 153–70; Lupton and Lipps.



**Figure 5.21:** *A Winter Smellwalk in Kyiv (2017)*. Screen capture showing combination of digital media used to enable practice-theory relationship through reflection-in-practice while mapping Kyiv smellscape

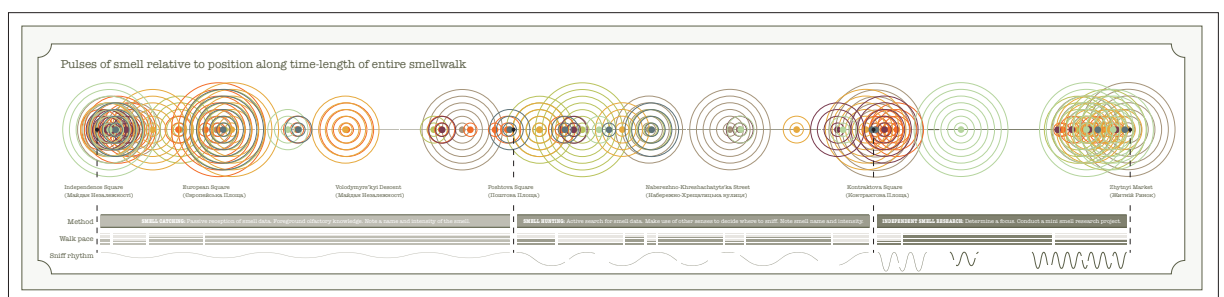
I divided the Kyiv smellwalk into three sections as outlined in Chapter Three (pp. 93 – 94); each of which affected the somatic rhythms of walking and sniffing. To highlight the reciprocal rhythms I visualised walking pace with a histogram indicating relative speed, sniff rhythm with an undulating, broken line, and smellwalking method as solid bars with increasing colour value fills. Smellwalker bodily movements involved in perceiving the olfactory city can be compared as shown in Figure 5.22;



**Figure 5.22:** *A Winter Smellwalk in Kyiv (2017)*. Visual comparison of smellwalk method, walk pace and sniff rhythm

As can be seen in Figure 5.22 sniff rhythm in the initial 'Smell Catching' stage is a gentle, constant wave in line with regular breathing. Walking pace was slowed by staircases and the volume of pedestrians until reaching European Square when walking pace increased. From Poshtova Square, and a change to the smellwalking method to 'Smell Hunting', arrhythmias occurred in sniff rhythms. Subsequent arrhythmias were created by interruptions to 'stop and sniff' which necessitated a break in walking pace and an increase in sniffing rate. Arrhythmias are created by interruptions, and interruptions cause arrhythmias. The pace of the walk picked up towards the end when, having spent nearly two hours in the cold, smellwalkers wanted to move quickly resulting in a complete break from sniffing. Finally the walking rhythm slowed due to the populated environment of the indoor market and the sniff rhythm increased with 'Smell Research'.

When the smelling method, walk pace and sniff rhythm are coordinated with smells detected relational patterns emerge (Figure 5.23). While the volumes and sizes of smells noted varied according to the individual smellwalker, a vibration of similar intensity is apparent at the start and end (when indoors) of this smellwalk, with greater variation in the central (outdoor) sections. Polyrythmia occurs as 'bodies modify themselves' so as to detect the smells of the city.<sup>309</sup>



**Figure 5.23:** Pulses of smell, a section from *A Winter Smellwalk in Kyiv (2017)*. Smell position relative to time along the length of the entire smellwalk

309 Lefebvre, *Rhythmanalysis*, p. 49.



Where *A Winter Smellwalk in Kyiv* mapping included Lefebvrian punctuations that mark out a rhythm, *Taking a Line from its Walk* examines their vitality.<sup>310</sup> The former provided an overview, whereas the latter investigated smells' dynamic qualities. Subsequent mappings in this section emphasise when people detected smells over what they smelled. The size of the smell directly references perceived intensity as noted by individual smellwalkers, to whom I allocated one colour per person. Based on the average length of a human breath, each smell duration is four seconds. The title of the work is taken from Klee's description of the drawing of a line free of all restriction.<sup>311</sup> However, in this instance the unrestricted line of the walk is marshalled into an organised linearity to depict rhythms of smelling.

This animated mapping deliberately despatialised the smellwalk, and in removing place specificity I foregrounded the temporal aspects (Figure 5.24). When recast as a straight line, the number and intensity of smell detections early and late in the walk are notable in comparison to the olfactory voids in sections between stopping points. I suggest this despatialised mapping approach reflects the imposed rhythms of the walk's structure more clearly and delineates a polyrhythmic co-existence of seven individual sets of smell encounters as it highlights the human subjectivity of smell perception in Kyiv's smellscape.

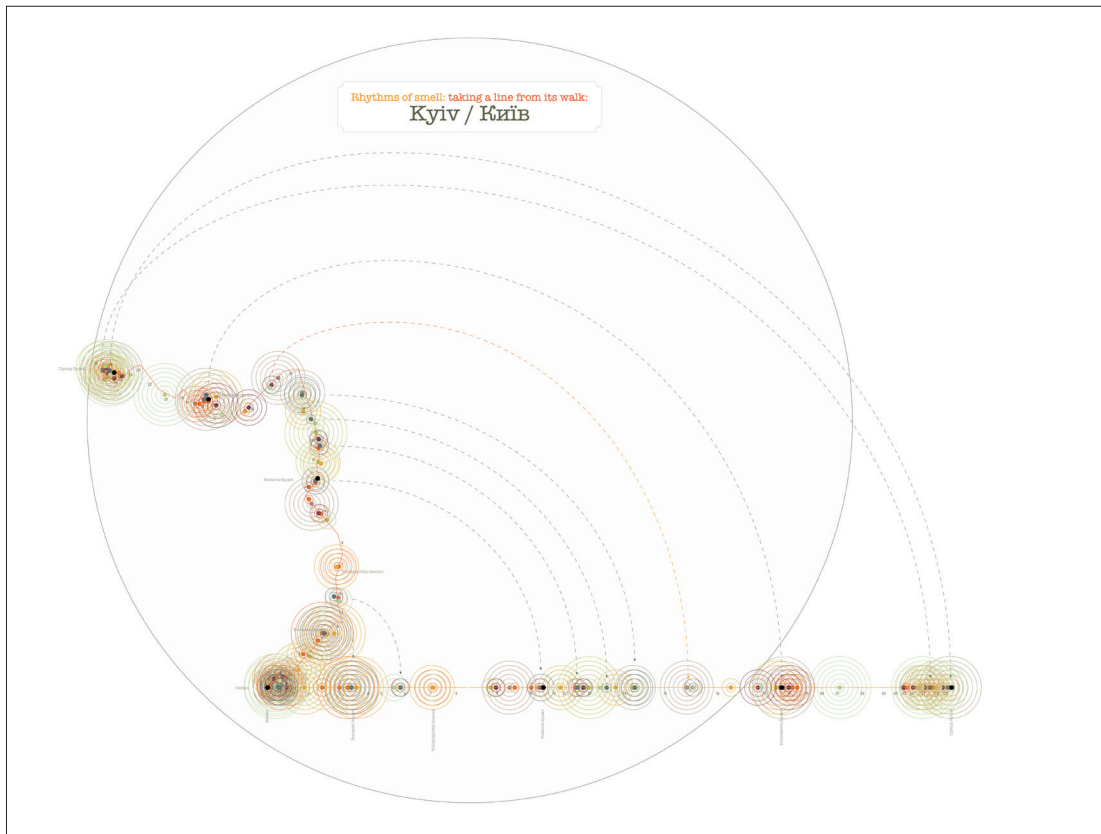
In order to detect a smell, we must first inhale odour molecules; each sniff including many smells from a range of sources. In a single sniff we might take in odour molecules from an item and its surroundings; the combination of a strawberry, the interior of the market and animal fur for example comprises hundreds of individual volatile molecules. In a research paper written while undertaking MA Philosophy, The New York for Social Research, Andreas Keller explained how humans perceive lighter smell molecules soonest after inhaling, and heavier smell molecules slightly later.<sup>312</sup> The time taken for each molecule to travel up the nasal cavity is

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310 Lefebvre, *Rhythmanalysis*.

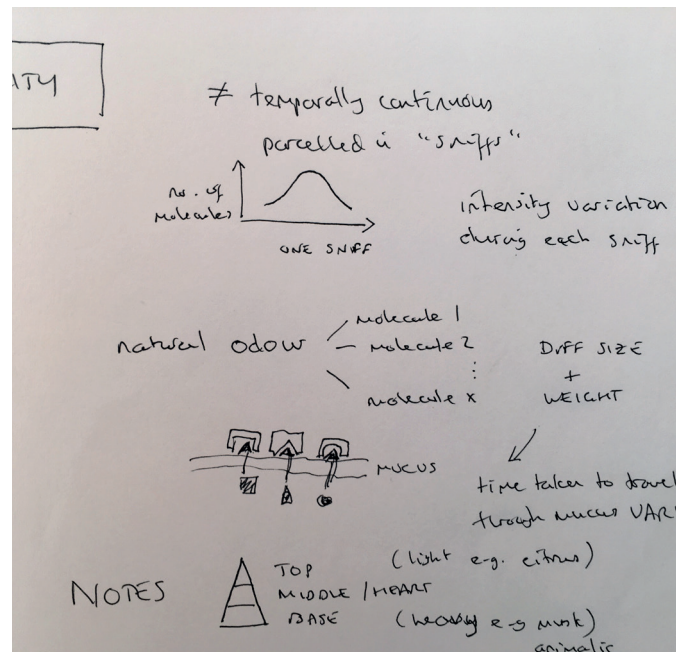
311 Paul Klee, *Notebooks, Volume 1: The Thinking Eye*, ed. by J Spiller, trans. by R Manheim (London: Lund Humphries, 1961).

312 Andreas Keller, 'Phenomenology of Smell (Term Paper)', 2008.



**Figure 5.24:** *Taking a Line from its Walk (2017)*. Creative process: deliberate de-spatialisation

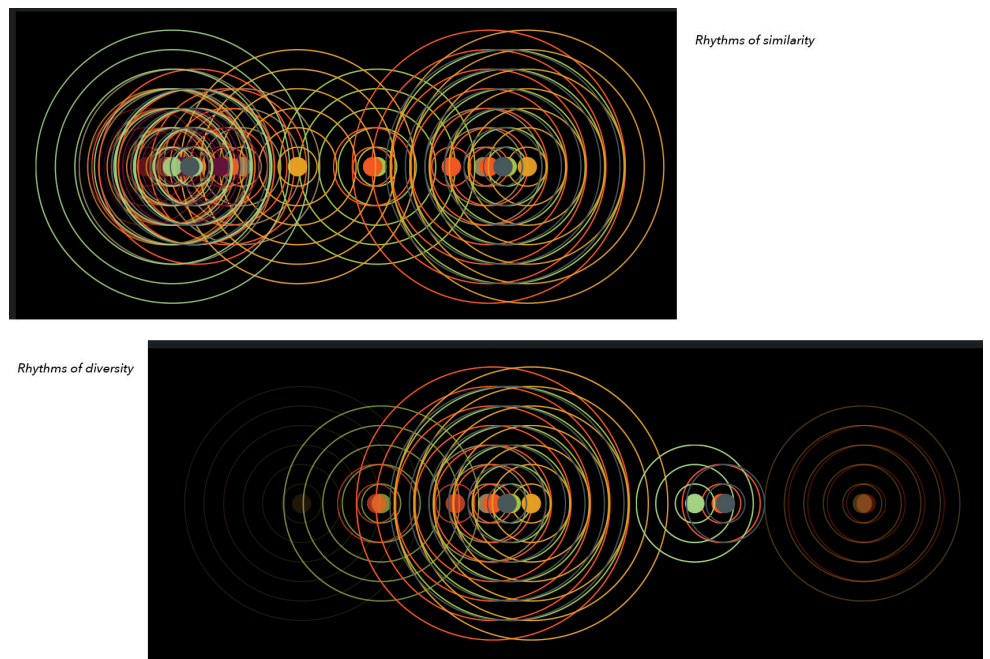
dependent on weight; lighter molecules travel faster. Therefore from a physiological perspective, the smellscape is in constant motion, invoking multiple temporalities in the physical experience of sniffing and smelling (Figure 5.25). My approach to smell visualisation in this case study was based on my understanding of smell detection as parcels of related sniffs with memory acting as a linking mechanism. This frame-by-frame approach enables smell to be conceived as an animated sense and represented using animation.



**Figure 5.25:** Sketchbook visualisation (2014). Multiple temporalities of sniffing and smelling experience

In the final thesis Keller revises his original phrasing to explain the physiology and perception of the temporal nature of the smellscape in which human perception of smell is temporally discontinuous, parcelled into ‘odor successions’ that are then affected by environmental wind conditions.<sup>313</sup> An understanding of smell that accepts this temporal parcelling, along with the fluctuation of olfactory detection from light to heavy odour molecules within a single sniff, helps to explain just why no two smells are perceived as identical (even when detected by the same person). These are significant details behind my animated smellscape mappings.

To create the animated mapping, *Taking a Line from its Walk* (Figure 5.26), I used the Kyiv dataset. The resulting animation accentuates the idea of repetition with difference and highlights rhythms of similarity and diversity as can be seen from screen grabs and online.<sup>314</sup> Moreover, the animation symbols fade, referencing decreasing smell intensity as a result of molecular volatilisation and human adaptation.<sup>315</sup> Animation highlights the temporal nature of smell experience as sequential where previous mappings represented spatial, sensorial experiences of the city.



**Figure 5.26:** *Taking a Line from its Walk* (2017). Screen grabs of smells in suspended animated sequence indicating concordance and difference

313 Andreas Keller, ‘Phenomenology of Smells’ (unpublished Masters Thesis, The New School for Social Research, 2009), p. 37.

314 The animation mapping entitled *Taking a Line from its Walk* is available at <https://vimeo.com/213713916> – password: linewalk

315 Engen.

I set the animation on a black background to increase visual contrast and each smell instance lasts for the average length of a human sniff, four seconds, reducing the two hour smellwalk to twenty-five seconds.<sup>316</sup> The resulting superimposed wave patterns pulse and evince how smells might be subject to interference in the air. *Taking a Line from its Walk* (Figure 5.26) provides a model to communicate layering of everyday smellscape and the polyrhythmic contradictions of those detecting it. This may inform future modelling systems for current, historical and future smellscapes.

The series of animations *Walking and Sniffing in the Wind: Smellwalk Rhythms I – VII* consider the spatiality of smells encountered, drawing attention to the temporality of encounter and dynamics of the airspace in which each smell was perceived. In this series of practical works I address participant smellwalks individually. The spatially-located smell symbols morph according to wind speed and direction (Figure 5.11) and fade within a timeframe. Early in his critique Lefebvre remarks that:

We know a rhythm is slow or lively only in relation to other rhythms (often our own: those of our walking, our breathing, our heart). This is the case even though each rhythm has its own and specific measure: speed, frequency, consistency.<sup>317</sup>

Comparative rhythms within the smellwalk include the smellwalker's linear smell detection sequence, somatic stoops and sniffs, linear duration of the walk, global wind patterns of a winter in Kyiv. Each rhythm is played out individually, and then superposed as theory and practice combine to create new knowledge of multiple smellwalk temporalities.

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316 Barrett.

317 Lefebvre, *Rhythmanalysis*, p. 20.

The following sections should be read alongside respective motion graphic visualisations accessible online with a password as indicated in the footnotes:

- Smell detections from smellwalker #1 are slow and stately. They occur at regular intervals with strong intensity and thus have strong, visible presence with a conflation of two smells at end of the walk;<sup>318</sup>
- Smell detections from smellwalker #2 appear in staccato bursts between peaceful interludes of olfactory silence;<sup>319</sup>
- Smell detections from smellwalker #3 are light and lively, occurring with a regular rhythm. The sheer quantity of smell detections results in a more constant beat along the route than other participants. Smell detection ceases towards the end of the walk before a finale that is in keeping with other participants;<sup>320</sup>
- Smell detections from smellwalker #4 are steady, sequential and sustained with limited smell interaction until the final sniffing exercise in the market during which four smells mingle;<sup>321</sup>
- The sequence of smell detections from smellwalker #5 is marked by subtlety and delicacy; the smells are small in stature, reticent in their apparition and subsequently diminish;<sup>322</sup>
- The series of smell detections from smellwalker #6 commence with two intense smells, includes a long smell void in the central section hinting at barely perceptible odours before a greater intensity of smell experiences at the end;<sup>323</sup>
- Smell detections from smellwalker #7 appear calm and considered, verging on tentative. The sequence fades to a series of smell sources with zero intensity.<sup>324</sup>

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318 <https://vimeo.com/213708419> (password = walk1)

319 <https://vimeo.com/213708796> (password = walk2)

320 <https://vimeo.com/213709054> (password = walk3)

321 <https://vimeo.com/213709305> (password = walk4)

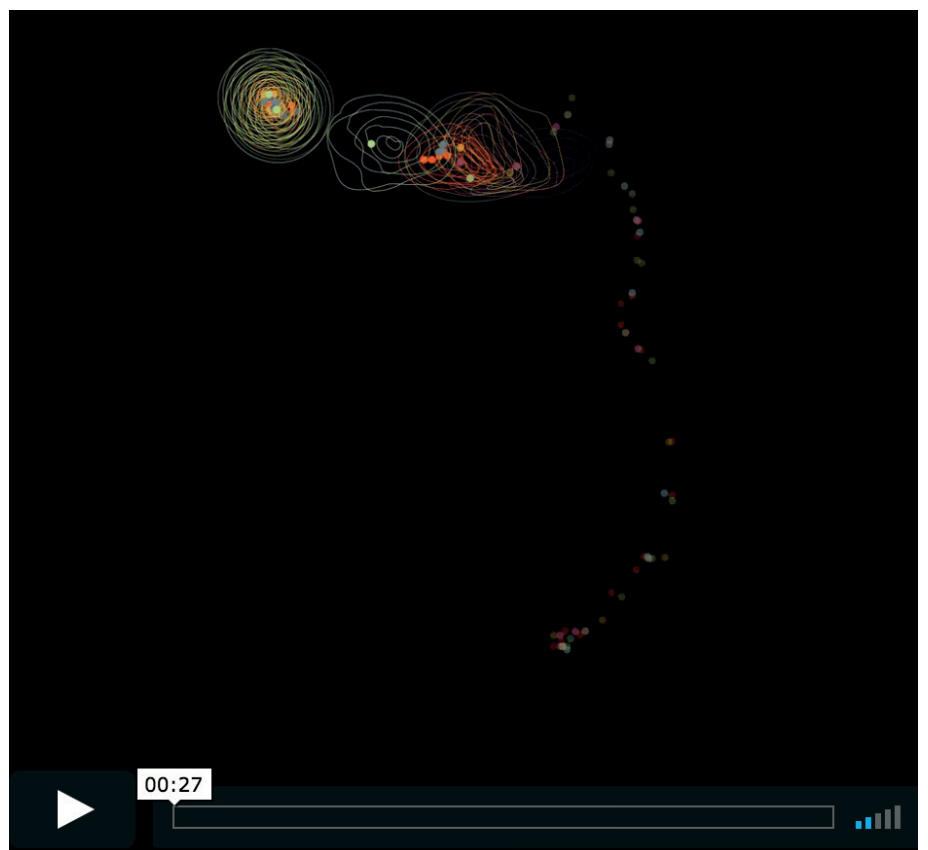
322 <https://vimeo.com/213709679> (password = walk5)

323 <https://vimeo.com/213709760> (password = walk6)

324 <https://vimeo.com/213710044> (password = walk7)

These separate sequences illustrate individual smell detection experience and inform the final stage of visually imagining a collective smellwalk experience.

The final animated mapping, *Polyrhythmias of the Smellwalk*, comprises superposition of individual smellwalk sequences to create a composite animation and an alternative format for communication of an aggregated smellscape.<sup>325</sup> As each of the encountered smells dissipates and disappears, its source remains as a reminder of the original source, an indicator of the path taken and the potential for a re-encounter at another time (Figure 5.27). My vision for subsequent work in this field, considered in Chapter Six, will go beyond such a single trail to examine how multiple, simultaneous smell detections in a variety of locations across the city might be recorded and communicated.



**Figure 5.27:**  
*Polyrhythmias of the Smellwalk (2017)*. Screen grab from animation. Composite layered series of seven smellwalks in Kyiv

325 <https://vimeo.com/211929457> (password = polyrhythmia)

## 5.5 Discussion: motion, rhythm and spatiality of smell

As a practice the smellwalk fulfils a dual role; simultaneously a data collection tool and a designed artistic experience facilitating individual mappings of olfactory airspace. The relationship between smelling and walking is reciprocal, and in eternal flux. When focussed on rhythm, smellscape mapping combines somatic and environmental experiences from multiple viewpoints – top down (the route), lived (walking and sniffing pace), in-motion (the smells in drift mode) and static (materially-embedded smell sources).<sup>326</sup> This approach, as Edensor points out, ‘emphasises the dynamic and processual and thus circumvents reifications of place and culture which purvey geographical notions of place as static’ contributing to arguments for the significance of the temporality of place.<sup>327</sup> While smellscape space might be conceptualised as constantly in motion, it is only brought into being through bodily encounters and detections. By focussing on activity and methods of engaging with the city ‘momentary enactments and rhythms of difference undermine and contradict essentialist thought’ enabling new conceived spaces of smells to emerge.<sup>328</sup>

Despite assertions that the human body does not detect as many smells in cold weather, the seven smellwalkers who completed the walk produced a collective list of nearly ninety identified odours while under guidance to restrict their smellnotes to twelve apiece.<sup>329</sup> Thus, human experience of smell is shown to be heterogeneous; smells exist, they are both present and identifiable in the environment when we play an active role in seeking them out. Smells elicited through smell-sketching point to multi-scalar temporalities; millennia, seasonal, a single sniff. Diurnal temporalities were witnessed in the ‘animal fur’ of the market and the ‘asylum’ both of

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326 McLean, ‘Mapping the Invisible and the Ephemeral’.

327 Edensor, ‘The Rhythms of Tourism’, p. 57.

328 Helen F. Wilson, ‘On Geography and Encounter: Bodies, Borders, and Difference’, *Progress in Human Geography*, 41.4 (2017), 451–71 (p. 464).

329 DNews, ‘Why Cold Air Smells Different’, *Seeker - Science. World. Exploration. Seek for Yourself*, 2014 <<http://www.seeker.com/why-cold-air-smells-different-1768222636.html>> [accessed 16 February 2017].

which are busy places operating regular cycles of repetition over daily and weekly schedules.<sup>330</sup> Seasonal smells of 'fungus' and 'winter' might be seen as markers of cyclical constancy and reliability, but they also hint of constant change. The smellsketches testify to an understanding of smell that is far from inert or passive, from a momentary sniff of the hundreds of volatile molecules present in a strawberry to the subtle, permanent presence of pine that contributes to Kyiv's background smell. As such smell is neither abstract nor invisible, but rather physically witnessed and recalled over time, especially the worsening, negative smell of burning garbage.

*A Winter Smellwalk in Kyiv* points to diversity and contingency in human experience. While there are endless opportunities for a repeat smellwalk, following the same route at the same time on a new day, anticipating the spiralling wisps of evanescent smells, it is unlikely that a repeat smellwalk would ever be a direct replication of the first.<sup>331</sup>

*Taking a Line from its Walk* reframes space as time to reveal how the small-scale temporalities of breathing and sniffing combine to create repetitive patterns of smell detection. A pulsing timeline of interference amongst detected smells is similar in format to that generated as several stones are thrown into a pond simultaneously or the movements of waves generated as currents oppose the wind direction.<sup>332</sup> And so the smellscape, as an experienced phenomenon, might be understood to exist in a constant state of potential interruption. Through the representation of smells as ephemeral repetitive patterns of detection unfold, a 'repetition in movement' captures the rhythms of both the body and the city's odours.<sup>333</sup> Animated mapping of the smellwalk shows how human perceptions of smells have their own beats, pulses and fades whose rhythms interact. Each of the

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330 Elena Shcherbak, 'Zhytniy Market Kiev | Spotted by Locals', Spotted by Locals Kiev, 2017 <<http://www.spottedbylocals.com/kyiv/zhytniy-market/>> [accessed 10 March 2017].

331 Lefebvre, *Rhythmanalysis*.

332 Lefebvre, *Rhythmanalysis*.

333 Lefebvre, *Rhythmanalysis*, p. 86.



smellwalkers generated singular smell detection rhythms as their unique patterns of sniffing unfolded.

The *Smellwalk Rhythms I – VII* series highlight smell movement and transition; a phenomenon specifically recited to me by one smellwalker smellwalking Volodymyrs'kyi Descent from a city square to the river. At the top of the hill, a distinctive smell of the river was apparent to him. Halfway down the slope the river smell vanished, only to recur at the bottom of the hill. I suggest how the temporal and volumetric space of the smellscape can be imagined through layering individual smell observations on top of each other. A walk through any environment will afford sequential smell detection, noted via a sniff facilitated by an intake of breath. For an individual, the overall smellscape composition results from a piecing together of parcels of sniffs – indeed, individual smellnotes take account of one perspective, precluding those smells at different heights to the sniffer's own nose. The entirety of the smellscape contains many smells at any given moment all of which overlap and interact as they drift in airflows and sink to ground level. The final mapping in this series, *Polyrhythmias of the Smellwalk*, visually examines how such a combined smellscape might be communicated visually.

*Smellwalk Rhythms I – VII* were layered to create *Polyrhythmias of the Smellwalk* resulting in an organic mass of smell data in motion. The dense smell zone at the beginning of the walk is convoluted and complex. Rhythmic ribbons of smelly interactions occur in the central section of the walk. The finale takes place in the enclosed space of Zhytyniy Market where the enclosed space generated a bounded swirl of smells. Visualised in the animation the wake of the walk, a trail of semi-transparent static dots indicating smell sources, call attention to original source locations, and the possibility for detection by another smellwalker. Through agglomeration of multiple sequences a relativity emerges since, as proposed by Lefebvre, rhythm is best measured by comparison to other rhythms, their coincidences marking plurality of interactions and reciprocations.<sup>334</sup> In creating the maps I came to understand how smell experiences might be

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334 Lefebvre, *Rhythmanalysis*.

qualitatively compared, and to discern collective rhythmic patterns created through visual interference.

A potential shape and form of a collectively apprehended smellscape is expressed in *Polyrhythmias of the Smellwalk*. The animation mapping possesses eurythmic qualities demonstrating diversity of intensity and a combination of slow and faster paces. A syncopation, and sense of the offbeat, arise as smell isopleths overlay themselves and each other. Henshaw and Porteous both imagine smellscape from the purview of a single being, 'limited by the height of our noses from the ground, where smells tend to linger'.<sup>335</sup> The Kyiv smellwalk mappings build from such individual perspectives, aggregating isopleth narratives, reframing the smellscape to exist simultaneously from multiple perspectives. We may never experience or fully understand the smellscape from the point-of-smell of another; but mapping it in a collective manner 'has a creative potential to reveal the unseen, ephemeral and imagined'.<sup>336</sup> We may come to greater appreciation of the smellscape's complexity through combinatorial mappings of subjective experience. The resulting work is an abstraction that, as yet, only hints to the dimensional possibilities of representing the smellscape as a never-ending series of intertwining, morphing, volatilising, tumbling smell molecules in physical space.

This case study commenced with a static map depicting a recorded smellwalk. Through analytical practice I have shown how linking theoretical constructs in rhythmanalysis with mapping practices can result in new relations being observed; movement of the human body in space is integral in understanding the smellscape. Through a series of evanescent, dynamic mappings I have shown how the experienced qualitative smellscape might be understood as part of a meteorological phenomenon. In the next chapter I draw together theory and practices, summarise the

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335 Porteous, p. 25.

336 Kate McLean, 'Communicating and Mediating Smellscapes: The Design and Exposition of Olfactory Mappings', in *Designing with Smell: Practices, Techniques and Challenges*, ed. by Victoria Henshaw and others (London: Routledge, 2017), pp. 67–76 (p. 76).

relationships between spatial and temporal aspects of smell and assess the two case studies' contribution to the overall thesis and research questions.

## Chapter Six

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Findings, insights,  
limitations  
and conclusions:  
eye-visible  
smellscapes

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Having presented and discussed how non-visual, sensory, olfactory information might be detected, recorded and communicated through social, performative mappings this final chapter concludes my research findings. I position the work within communication design, outlining the significance of my original contributions to knowledge and highlight the limitations of the work, discussing future developments arising from contributory projects. I conclude with my vision for how nuanced, sensory information can benefit from the design practice of sensory communication.

In my thesis, I developed the main research question:

**How might subjective, dynamic, vernacular, urban smellscape be rendered ‘eye-visible’?**

To do this I addressed two secondary questions:

- 1. Which mapping practices and formats best reflect human subjectivity, ephemerality of smell and the uniqueness of particular scapes?**
- 2. What constitutes the smellscape, and how might it be conceived as a spatial and temporal environment?**

As a design practitioner, I approached the work as research-through-design, using a smellwalking methodology for data collection, agentic mapping practices and rhythm analysis as analytical methodologies, and visualisation through creative cartographic symbolisation, with mapping conventions to represent the spatial and the temporal aspects of olfactory-sensed environments.

The resulting smellscape mappings offer practice-led and practice-based contributions to knowledge. The printed pieces, *Scentscape 06 • 2015 The City of Singapore*, ‘odours of the morning and evening’ and

*A Winter Smellwalk in Kyiv* and the animation sequences, *Walking and sniffing in the wind: Smellwalk Rhythms I – VII*, are practice-led in that their creation provided the operational knowledge for subsequent works.<sup>337</sup> These works seek to define the scope of the problem, suggest possible solutions and summarise interdisciplinary theoretical underpinnings to their creation.<sup>338</sup> The practice-based works, *Scentscape Singapore II*, *Taking a Line from its Walk* and *Polyrhythmias of the Smellwalk* contribute new insights into volumetric spatial and temporal dimensions of social, human-sensed, olfactory information, suggesting original forms for its communication and remediation. In the next section I summarise the practice and thesis in order to emphasise key findings.

## 6.1 Findings

In Chapter Two I demonstrated through an interdisciplinary literature and practice review how the smellscape has been theoretically conceived as spatial, temporal, physical yet invisible. Examples of existing geospatial representation of smell has been largely either defined by the map's creator and is limited to either smell source location or synthetic chemical odour reproduction. Within communication design, limited consideration and representation of smells in air led me to develop my research questions.

In Chapter Three I explained how qualities of olfactory experience that enable it to be obtained, retained and shared derive from both olfactory arts theory and scientific approaches to odour monitoring.<sup>339</sup> The qualities of character, intensity, duration and hedonic tone were then used in the design of smellnotes for smellwalkers to record smell information during walks in their everyday urban environments. Adopting an ecological perspective, I indicated how the smellwalk enabled participants to detect smells and

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337 Candy.

338 Nigel Cross, 'Designerly Ways of Knowing', *Design Studies*, Special Issue Design Education, 3.4 (1982), 221–27 (p. 224) <[https://doi.org/10.1016/0142-694X\(82\)90040-0](https://doi.org/10.1016/0142-694X(82)90040-0)>.

339 Drobnick, 'Toposmia'; McGinley and Michael A. McGinley, 'Field Odor Monitoring and Enforcement'.

their potential sources, to differentiate between distant smells (of original high intensity subsequently dispersed) and proximal smells (those requiring human intervention for their release or detection), demonstrating that to smell requires both intent and action. Through an invitation to associate smell with colour the smellwalk participants conceived of smell as having unique, situated characteristics which in turn facilitated shared individual perceptions and acknowledgement of difference.

In Chapter Four I investigated three approaches to visualising the scentscape at ever-increasing scales exposing relationships between smell and people, places and diurnal activity. Use of conventional mapping vocabularies; contour, figure-ground, line and symbol served to spatialise olfactory information.<sup>340</sup> In producing maps that depicted smells' ephemeral and durational qualities I rendered an eye-invisible olfactory world into being.<sup>341</sup>

My first approach, based on the theoretical structure of the smellscape as a pyramid, classified original data into background, episodic and ephemeral odours.<sup>342</sup> The resulting practice-based piece, *Scentscape 06 • 2015 The City of Singapore*, combined smellscape theory, data analysis and creative cartography with city-specific contextualisation. The delicacy and restraint of the map belies its complexity; communicating how multiple smells might intermingle across the city's surfaces of land and sea. Dispersed cloud-like formations of smell particles communicate both an ethereal quality and indicate the possibility for smell collisions. The legibility afforded by a figure-ground relationship in which much of the map is white reflects the 'number-of-breaths-taken-to-perceived-smell' ratio, references the human-smell relationships of adaptation and the lightness of smell molecules transported by air currents.<sup>343</sup> The map can be read as the capture of an olfactory moment in time.

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340 Waldheim and Desimini.

341 Lauriault and Lindgaard.

342 The classification is communicated in the legend of the map where smells are categorised into background, episodic and curiosity scents.

343 Waldheim and Desimini; Engen.

In my second approach I eliminated the neat line to communicate the smell-space relationship as an unrestricted cloud. Perceived smells, measured according to their perceived duration on a scale of 1 – 8, form the vertical z-axis to portray an alternative visualisation of olfactory experience. The human form I placed within the model alludes to the contingency of experience and intimacy of encounter, as the relationship between subject and object in the world of smells and the places they reside are communicated through new spatial forms.<sup>344</sup>

My third approach used smellsketching in watercolour to mimic the dissipating and ephemeral qualities of smell detection. Rendering the smellscape in painted form enabled me, the designer, to become more intimate with the smell perceptions of other people and immerse myself in their descriptions and qualitative assessment. Translating scentnotes into a painted form required considerable empathy and brought forth multiple temporalities as I read individual memories and smell associations as I painted the smells. The resulting individual scentwalk paintings convey a diversity of smellscape interpretation. Following my process for consolidating and simplifying the visuals, the final outlined forms, entitled '*odours of the morning and evening*', reveal the episodic nature of neighbourhood smellscapes.

In Chapter Five I investigated multiple scales of temporality embedded within a smellwalk from the momentary to the multi-millennial. By deploying Lefebvre's rhythmanalysis as a guide I enabled relationships to emerge between smell with time and place. The resulting animated maps rendered the smellscape as visible in the fourth dimension.

Graphic elicitation of smells, smellsketches – Kyiv, contained multiple temporal evocations including seasonal change, calendrical events, urban progression and links with personal memories. Participant-drawn sketches allude to smell-detectable repetitive differences such as the

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344 Lefebvre, *The Production of Space*, p. 197.



transition from sub-zero winters transition through spring to summer and the incrementally worsening smells of Kyiv's garbage site.<sup>345</sup>

Detection of smells is intimately bound to the somatic life-rhythms of the motile human body. Every smellwalk possesses alternating eurythmic and arrhythmic qualities. Practice-led work, *A Winter Smellwalk in Kyiv*, illustrates the symbiotic relationships between rhythmic walking, sniffing, breathing and encounters with smells. Visualisation of smell encounters along a timeline as symbolic forms leads to an understanding of the rhythmic relationships between smells and human movement.

The practice-based animation, *Taking a Line from its Walk*, depicts pulses of smell detection as perceived by individuals, and their projected, imagined interference with each other. The work reinforces Simpson's suggestion that rhythmanalysis, while biased towards looking for the revolutionary potential in arrhythmia, can equally be applied to 'emergent affections within polyrhythmic assemblages, of the linear on or with the cyclical rhythms that may exist'.<sup>346</sup> As transient and ephemeral smells are visualised along the imposed linearity and structure of the walk their relationship is symbiotic and interdependent, resulting in multiple, but not conflicting, rhythms.

The wind's influence on perceived smells along a smellwalk path can be seen in the practice-led studies *Smellwalk Rhythms I – VII*, which together form a new type of mapping, *Polyrhythmias of the Smellwalk*. In this work human perception of the smellscape has distinct and harmonic rhythms of its own. Through visual remediation human smell detection is shown to do more than act as markers for everyday rhythms, instead possessing pulses, beats, repetitions, fades, 'stops, silences, blanks, resumptions and intervals' which in turn record and legitimise something that cannot be seen or heard.<sup>347</sup>

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345 Lefebvre, *Rhythmanalysis*.

346 Paul Simpson, 'Chronic Everyday Life: Rhythmanalysing Street Performance', *Social & Cultural Geography*, 9.7 (2008), 807–29 (p. 823).

347 Lefebvre, *Rhythmanalysis*, p. 86.

## 6.2 *Mapping practices and formats: insights and strategies*

The two case studies primarily addressed the following secondary research question;

**Which mapping practices and formats best reflect human subjectivity, ephemerality of smell and the uniqueness of particular smellscapes?**

The types of mapping deployed in this practice research included:

- Walking
- Written notes
- Sketching (with watercolour)
- Temporal animations
- Spatio-temporal animation
- Spatial maps (large scale)
- Spatial maps (small scale)
- 3D model

**Case Study 1:** In Singapore I explored seven distinctive neighbourhoods in the city from the perspective of over two hundred local people. I collected and transcribed primary smell information from handwritten scentnotes to provide a dataset for three types of visualisation:

1. *Scentscape 06 • 2015 The City of Singapore*, a small-scale city map of the space above ground level is a highly-selective, qualitative mapping which exposed the commonalities of smells across different parts of the city.
2. A vertical extraction of the original map, *Scentscape 06 • 2015 The City of Singapore*, formed the basis for a conceptual, volumetric mapping to project the activity of walking through a cloud of possible smells. While limited by its depiction of only a single moment in time, *Scentscape Singapore II* depicts physicality in the space of olfactory encounter.
3. On a larger scale to explore collective, diurnal difference, the '*odours of the morning and evening*' series detailed the changes apparent between two periods in a single day in the same location. A highly subjective

mapping created through third-party watercolour interpretations of scentnotes resulted in a series of comparative linear cartographic forms.

**Case Study 2:** In *Kyiv I* I investigated one smellwalk from seven perspectives (one from each of the smellwalkers) which generated five types of visualisation:

1. Smellsketches created by the smellwalkers indicating a summary smell watercolour visual with written explanation;
2. *A Winter Smellwalk in Kyiv*, a small-scale map of the city depicts the routes of seven smellwalkers as layered offset trajectories showing the diversity of individual olfactory experience. A cartouche explains polyrhythmic smellwalk rhythms;
3. The animation, *Taking a Line from its Walk*, combines the rhythms of breathing with perceived smell intensity to highlight pulse points of heightened olfactory experience;
4. A series of animations, *Smellflow Kyiv I – VII*, communicates the ephemeral and transitory nature of smells in airspace from an individual perspective;
5. Combining several smellwalks into one multi-layer animation, *Polyrhythmias of the Smellwalk*, communicates the smellscape as greater than a single person's perspective, considering what might be perceived through the nose of another.<sup>348</sup>

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348 Lauriault and Lindgaard.

Table 6.1 (below) summarises the types of mapping that might be deployed by researchers for future relational and comparative investigations of sensed olfactory environments.

<b>SMELL PLUS...</b>	<b>Space</b>	<b>Place</b>	<b>Time</b>	<b>People</b>
<i>Suggested mapping strategies</i>	<ul style="list-style-type: none"> <li>• Smellwalk</li> <li>• Written notes</li> <li>• Smellsketch</li> <li>• Sculptural (with human model)</li> </ul>	<ul style="list-style-type: none"> <li>• Smellwalk</li> <li>• Written notes</li> <li>• Smellsketch</li> <li>• Sculptural (with place reference)</li> <li>• Large-scale spatial</li> <li>• Small-scale spatial</li> <li>• Spatio-temporal animation</li> </ul>	<ul style="list-style-type: none"> <li>• Smellwalk</li> <li>• Written notes</li> <li>• Smellsketch</li> <li>• Spatio-temporal animation</li> <li>• Temporal animation</li> <li>• Information graphic</li> </ul>	<ul style="list-style-type: none"> <li>• Smellwalk</li> <li>• Written notes</li> <li>• Sculptural (with human model)</li> <li>• Spatio-temporal animation</li> <li>• Temporal animation</li> </ul>

**Table 6.1:** Temporo-spatial mapping practices and their suitability for representing relationships between smells and place, space, time and humans

According to smellscape theory, smell plus space is conceived as fragmentary; accordingly my mapping of smell and space shows how smells are 'located with reference to source, air currents, and direction and distance from source'.<sup>349</sup> These relationships take account of the environmental context in which smells are located, imagining how ordinary people might be immersed and engaged with them on an everyday basis. Smell and space visualisation requires imagining odours as possessing a physical form although the smellwalk is a forum for physically experiencing smell change based on height from the ground and proximity to source.

Smell plus place relationships concern smells that form part of the lived space incorporating the people, built environment and natural landscape in which they are detected. More than simply chemical molecules, smells in place have meaning and memories attributed to them. While different places have distinct smellscapes that may be understood to enrich their character, it is important to note that a smell's origin and point

349 Porteous, p. 26.

of perception may be considerable distances apart. Also noteworthy is that the changing nature of smells over time indicates the ephemeral nature of place itself.<sup>350</sup>

Smell and time relationships, rhythm in particular, 'provides a valuable focus' to analyse the transient nature of the olfactory environment and the multiple temporalities therein.<sup>351</sup> Mapping can be used to analyse Rodaway's theories of how 'smells infiltrate or linger, appear or fade'.<sup>352</sup> This might include a study of change as cities adopt varying seasonal patterns of activity repeated over a year, a decade, a century. Or it might be more personal; the duration of particular smell's detectability, the perceived ephemerality of smell mutations, the persistence of smells embedded in material surfaces of earth and architecture, or how individual smell perception changes according to the body's internal clock.<sup>353</sup> Combining individual smellwalk animations highlights the relationality of the small-scale cyclical (undulating and repetitive sniff rhythms) and large scale cyclical (meteorological and seasonal) with the linear (organised walk).

Smell plus people relationships encompass all of the above and also incorporate the vocabularies people use to describe smells, the ecological nature of smell perception, how people react with objects based on their odours, the individual nature of sensed experience, the affective power of aromas, peoples' fragrance biases and empathy conjured through smells.

Through practice-based interrogations of smellscape theory, I have demonstrated how the temporal and the spatial aspects of the smellscape are best conceived as inextricably intertwined and multi-dimensional. Each type of mapping has the capacity to depict different relationships between smell plus place, space, time and people, with the aim of communicating greater awareness of olfactory detail. All the practices are agentic in that

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350 Drobnick, 'Toposmia'.

351 Edensor, 'Rhythm and Arrhythmia', p. 163.

352 Rodaway, p. 64.

353 Rachel S. Herz and others, 'The Influence of Circadian Timing on Olfactory Sensitivity', *Chemical Senses*, 43.1 (2017), 45–51.

they enrich experience, diversify worlds and call into being new places and actions. Equally, each is performative in that they happen through social action, words, narrative and movement resulting in the co-constitution of new worlds.

### 6.3 *Original contribution to knowledge*

In developing methods and practices to render the smellscape eye-visible I tested a number of approaches. Through the process of visualising smell as a component element of two places, Singapore and Kyiv, and by giving smells form, shape, colour and dimensionality, I developed a comprehensive and cohesive eye-visibility for the smellscape that was not in place at the start of this research. This counters claims of the impossibility of representing smells due to their almost infinite variability, although the limitations of the research mean that findings are confined to the human-perceived smellscape and not the entirety of potential smell molecular compounds.<sup>354</sup> Throughout the research I have initiated and facilitated smell-based discussion between the smellwalk participants encouraging an appreciation of the rich sensory contribution of an ephemeral aspect to everyday lives. In representing the findings visually I have identified original ways of using rhythm analysis as a method; the overlaps and interferences of smell perception depicted in *Taking a Line from its Walk* can be seen to indicate diversity and, while pointing to the potential for arrhythmias, reveals an aesthetic beauty in the layering of human experience. Thus rhythm analysis is more than simply a theoretical approach, it can also be practiced as a visual method.

More specifically, I have rendered the smellscape as eye-visible through mapping practices. These included: smellwalking, smellsketching by smellwalkers, smellnote writing, smell colour selection, animated smellscape mapping of individual and collective perceptions, third-party interpretative smell sketching, smell mapping using symbols to depict

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354 Jasper and Wagner.

selected smell information and characteristics, superimposed smell duration contour mapping and 3D sculptural imaginings. As inventions within sensory communication, the outcomes depend on both the smellscape's content and its context.<sup>355</sup>

To detect the smellscape requires structure; the practice of smellwalking is one in which feet, limbs, bodies, lungs, fingers, nails, ears, mouths, tongues and noses all mesh together. As a living practice smellwalking embraces meandering and focus, ambulation and striding, and human and inanimate encounters. In short, smellwalking practice embraces the deliberate encounter of the human body with olfactory experience in space where urban olfactory diversity is detected by individual relationships with the environment.<sup>356</sup> The smellwalk is a processual and performative mapping in its own right; one that communicates smells' fluidity by means of a 'sensual, volatile, immanent and embodied experience of the world'.<sup>357</sup> I developed the smellwalk's tripartite structure to scaffold immersion into nose-first engagement which in turn led to an understanding of people as active participants within a system where 'nothing is inert in the world'.<sup>358</sup> The practice of smellwalking calls on all senses to apprehend and understand the world; arriving at the concrete through experience.<sup>359</sup> Practices of smellwalking require individual agency and openness to the unknown in the construction of space.<sup>360</sup>

A deeply subjective methodology, such as creative smellwalking and smell sketching, as explicated in this thesis, might facilitate a more universal practice around smelling through its accessibility to non-specialists. The creative approach engenders in participants a desire to contribute to the creation of a greater artwork. The perfumed experience

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355 Kephart and Mikesell; Kuehn and others.

356 Wilson.

357 Edensor, 'The Rhythms of Tourism', p. 56.

358 Lefebvre, *Rhythmanalysis*, p. 17.

359 Lefebvre, *Rhythmanalysis*.

360 Wilson.

generates new methods of understanding the world through deliberate, focussed activity.

I have used design to investigate, and celebrate, the complexity and diversity of the smellscape. Sensed olfactory knowledge, gleaned by smellwalkers, has been shown to manifest itself in a variety of communicable visual forms making a valuable addition to its potential for re-communication. Deployment of cartographic conventions tethered smells to places on a flat printed surface, but subsequent iterations released the ephemeral dataset from the confines of the neat line, from two dimensions to three, and from being captured in a single moment in time. In generating contextually-based, multimodal representations which prioritise human subjectivity and call attention to the unique experience of every smellscape, I have reflected on the work and challenged its assumptions and limitations. As Corner suggests, the very act of reformulation allows 'novel and inventive possibilities to emerge'.<sup>361</sup>

The research offers ways in which we might think more creatively and critically about the production of maps. The production of maps needs parameters and datasets, resulting mappings reveals new relationships and connections. This research demonstrates how subjective responses to olfactory information can be regarded as a legitimate, valuable dataset. Individual agency of performed mappings such as the smellwalk and smell sketching fosters a critical voice for the non-expert mapmaker. I challenge the notion of the map as static and fixed, and offer *Polyrhythmias of the Smellwalk* animation as evidence for new forms of temporal mapping.

Place and space are fundamental and contested geographical concepts; the key difference between the two is acknowledged to be that place has unique qualities, whereas space is more abstract. This research contributes to the discussion through a proposition that the space of smell is volumetric and subject to temporal, environmental physical conditions such as airflow. Olfaction therefore maintains less differentiation between the two concepts.

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361 Corner, 'The Agency of Mapping: Speculation, Critique and Intervention', p. 251.



In the course of the research I noted that within design sensory communication, from smell to visual, is required to reduce dependence on smell-negligent Western vocabularies.<sup>362</sup> Unlike cognitive studies concerned with smell identification, this research has instead encouraged smellwalk participants to use a combination of language and smell-scales to describe their smell encounters. The resulting databases of smellnotes indicate variety, even within similar smells. This leads me to suggest that while isolated smell identification may be problematic, environmentally-contextualised activities such as smellwalking, procure abundant vocabularies for smell description. My research deploys three smell scales – intensity, duration and hedonic tone – and encourages individual bias to be regarded as legitimate smell information. Appropriating key characteristics of smells and re-mediating them through alternative sense-able media enables ordinary people to detect and communicate eye-invisible olfactory information. The design practices created in this research prompts my call for the development of a field of sensory communication.

The relationship between smell and technology is complex; while the digital replication of smell remains contested, technology might be harnessed to return us to our senses in more creative ways. Each of the smell mappings in this thesis was created using technology, and the Smellscaper app demonstrates the potential for linking direct sensory experience with digital platforms. Visual depictions of olfactory environments in which smell is rendered eye-visible as animated and colourful are designed to redress the connotation of smell as a negative experience. Indeed, future immersive smell visualisations might be designed to further initiate exploration of the human perception of the physical, sensed environment.

Overall this research provides an original contribution to the knowledge of how highly-individual sensed experiences can be detected, recorded and shared. It achieves this through a cohesive and consistent philosophy, an iterated set of interpretative methods for the detection and

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362 Lauriault and Lindgaard; Majid and Burenhult; Wnuk and Majid; JPorteous.

visualisation of the smellscape, a belief in the projective powers of the map, and imagination as essential requirements in understanding each other's smell-sensed worlds. The aim of my work is to promote active nose-first engagement through direct experience.

This research defines the features and potential roles of smellwalking and smellscape mapping practices in communicating subjective understandings of the smellscape in which contributions to knowledge emerge from practice.

#### *6.4 Pattern and place plus rhythm and space: towards 4D mapping*

As de Certeau points out it is impossible to conceive of the spatial without the temporal.<sup>363</sup> The spatial components of the smellscape are inexorably bound with the longitudinal experience of human-smell encounters. The smellwalk, undertaken in this research as a series of transects through the city, points to multiple temporalities of urban smells, and in so doing speaks to the unstable nature of time-space in the city. The patterns of place that emerged from Singapore mappings demonstrated the importance of volume to spatial understandings and experiences of smell, even though some smells may be lost to perception as they volatilise and diffuse, or rise too high (or sink too low) to be ordinarily detected by the human nose. The 3D sculpture vibrates with 'smell particles' alluding to the sense's kinetic characteristics.

Just as the Impressionists used brushwork to draw attention to the changing environment of light and hitherto impossibility of its representation, so the symbolisation of moving smells with static source locations on a printed smellmap emphasizes the limitations of paper as a medium of output. An emergent theme from the practice is the dimensionality of olfactory experience, cartographically expressed through spatial layering which I also utilised when depicting the temporal and ephemeral nature of

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363 Certeau.

smell experience through animation. The whole body of this work leads me to suggest future research would consolidate the two dimensionalities and explore how the rhythms of smell in spaces might combine with pattern and place reference to take the form of 4D smellscape representations. I envisage future sensory mapping practices will include both time and space, regard human influence on the smellscape from an ecological standpoint, and remain accessible to non-specialists.

In the following section I identify the research limitations and explain contributory projects indicating how they inform future developments of the field of sensory communication.

## 6.5 *Limitations of the research*

Inevitably the research included many more smellwalks, smellwalkers, design projects and commissioned works than those documented in the thesis and was ambitious in its scope. Every piece of smell-related work over the past five years has informed the findings in this thesis. In 2015, following one such collaborative project with the 'Good City Life' team on the *Smelly Maps* project, I envisaged being able to generate smellscape maps in real time, representing smellwalker detections based on my prototype animation models. Since this development work on 'live smellscape mapping' was completed within the remit of this thesis, I now briefly outline four sub-projects comprising two designed, and coded, versions of *Smellscaper* app, a prototype for live smellscape projection mapping and a field test of *Smellscaper*. The trajectory of these projects is important because it highlights potential approaches to follow-on work and the skillsets required to achieve them.

To create the first version, *Smellscaper v.1*, I worked with a final year (2014/2015) MEng student to transform blank smellnote forms into a smellwalking app. The project aims were threefold: to enable independent smellwalks to take place, to precisely geolocate smell detections, and to encourage public engagement with smell detection through a game-type

environment. Early designs and plans for the functionality and display of data on the app were optimistic (Figure 6.1).

In weekly meetings we discussed the nature of the smellwalk, digital design and data processing selecting basemaps, a database, and APIs to pull in weather data. After nine months of solid work the app operated as a digital smellnote and included functionality for users to contest the posted smells of others.

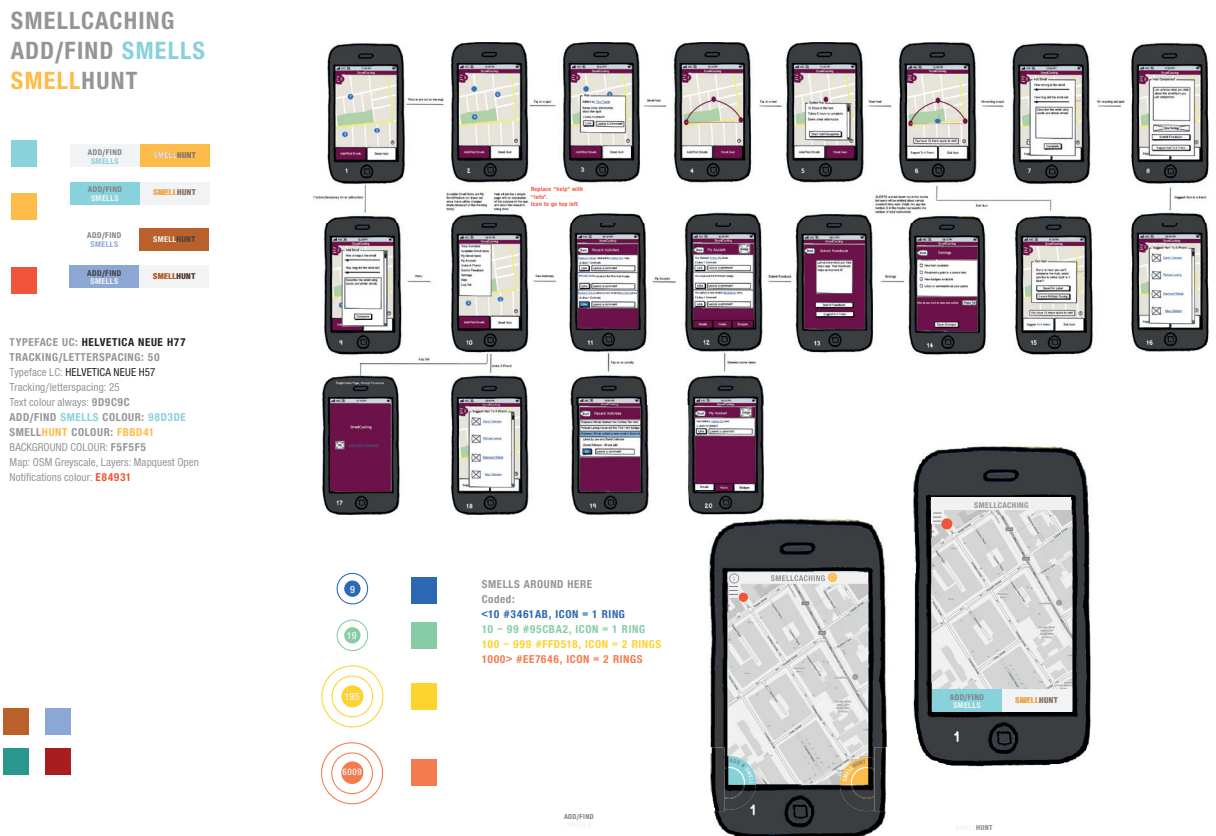
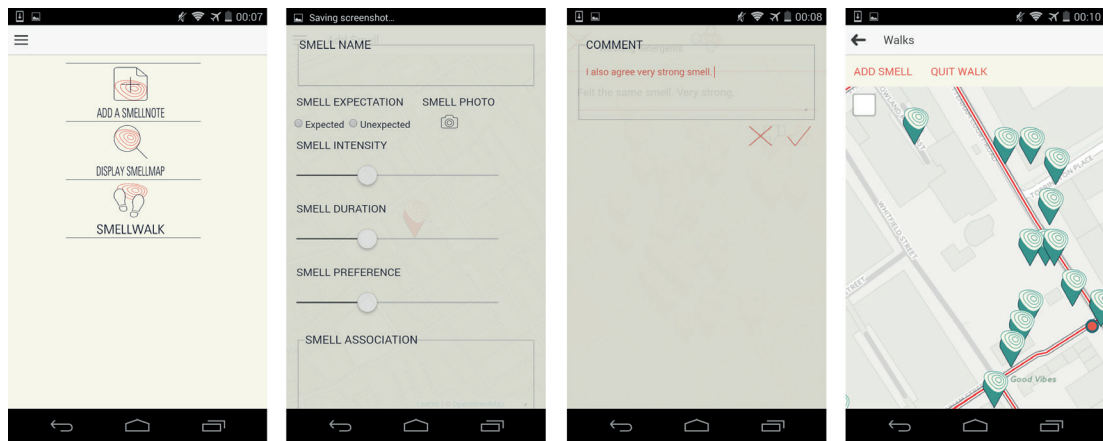


Figure 6.1: Designs for Smellcaching App (2015). Importing smellscape mapping to digital interfaces

However, my design aesthetic, based on previous smellscape mappings, did not transfer as sympathetically to the digital platform as I anticipated (Figure 6.2). The app development process prompted a larger consideration; how to balance a qualitative methodology with the quantitative capabilities of digital geolocation.



**Figure 6.2:** Screen grabs of Smellscaper v1 (2015): Home, Smellnote, Comment, Smellwalk. Development: Tina Fahalli

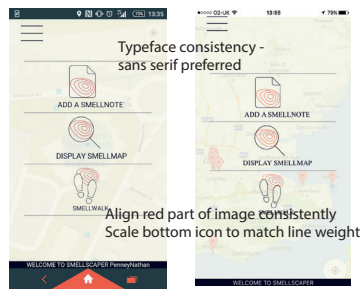
In April 2016 work on *Smellscaper v.2* commenced. I was considering how I might produce in-situ, real-time smellscape mapping. A small grant from my employer, Canterbury Christ Church University, provided funds to hire an app developer and a projection mapper to enable ‘the display of an image on a non-flat or non-white surface’ using real-time data collected through *Smellscaper*.<sup>364</sup> My aim was to orchestrate a small number of smellwalkers around different areas of Canterbury for a five-minute period, and to project an animation onto the external walls of the university art gallery in the city centre. I seriously underestimated the time and finances required to negotiate the technology, in areas that were not my specialism.<sup>365</sup> However, the app was successfully re-developed, and initial testing on Android and iOS platforms took place in June 2016 (Figure 6.3) resulting in a working app on two mobile platforms.

364 Brett Jones, ‘What Is Projection Mapping?’, *Projection Mapping Central*, 2012 <<http://projection-mapping.org/what-is-projection-mapping/>> [accessed 29 June 2018].

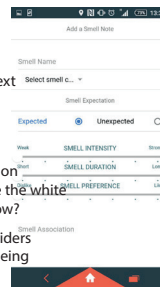
365 I made assumptions that the app developer would utilise the coding from version 1 and use the remaining time to assist the dissemination. In effect due to technological advances it was faster to redevelop than to update.

Lose the "Login with Facebook" option

No need for "hamburger" menu on Home page



Select smell category - all text needs to be visible please without "..."

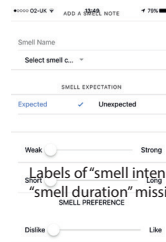


Sliders do NOT work on Android - cannot see the white button - add a shadow?

Non-movement of sliders results in smell not being added on Android

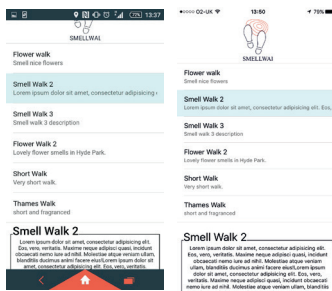
Slider only registers at 0 or 6, nothing in between and is VERY difficult to use i.e. nearly impossible.

No caps required

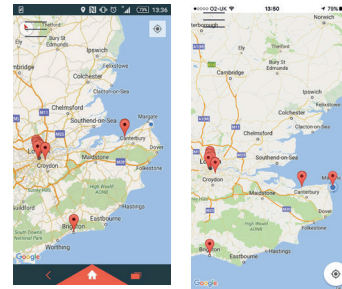


Labels of "smell intensity" and "smell duration" missing

Slider scale on Mac goes % and needs to be on a scale of 0 - 6 to match Android



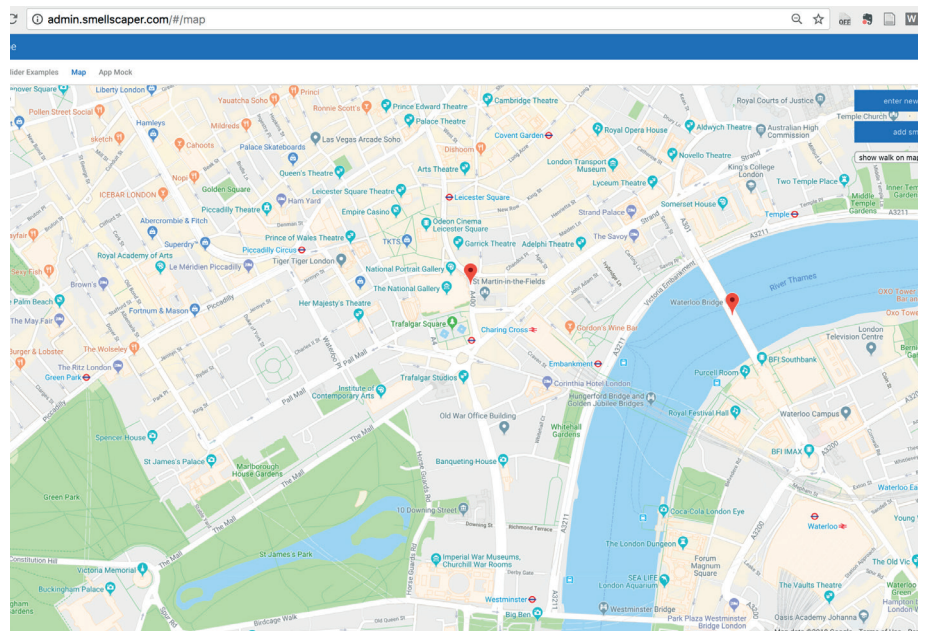
Can you add a "logout" facility please?



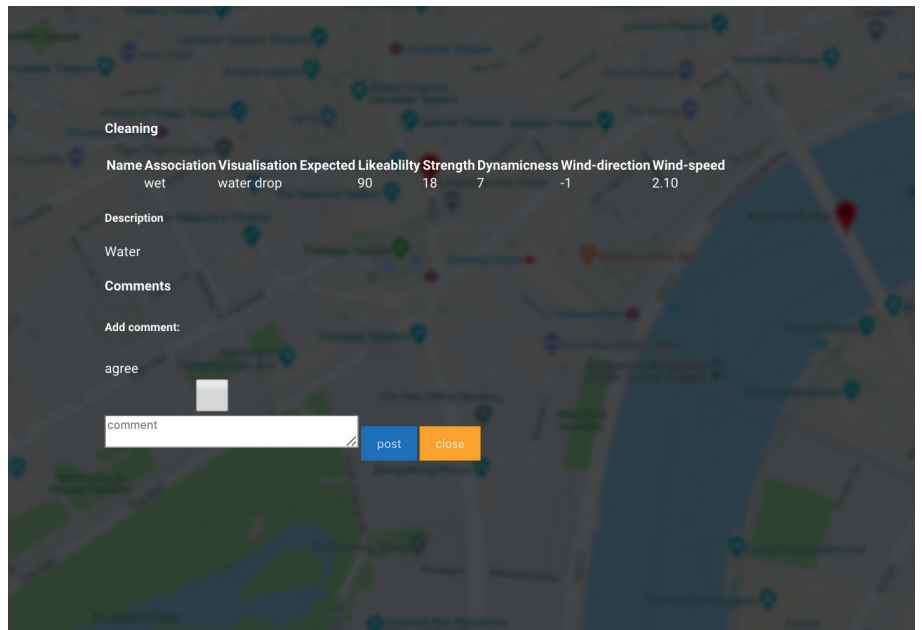
**Figure 6.3:** Testing comments for Smellscaper App v2 (2016). Development: Dominik Beste

This iteration, *Smellscaper v.2*, matched my design aesthetic more closely and included an accompanying website (Figure 6.4), in which clickable, geo-located pushpins enabled viewers to read the original smellnotes recorded by the smellwalker (Figure 6.5).<sup>366</sup>

**Figure 6.4:** Smellnote pushpins link to map (2016). Development: Dominik Beste

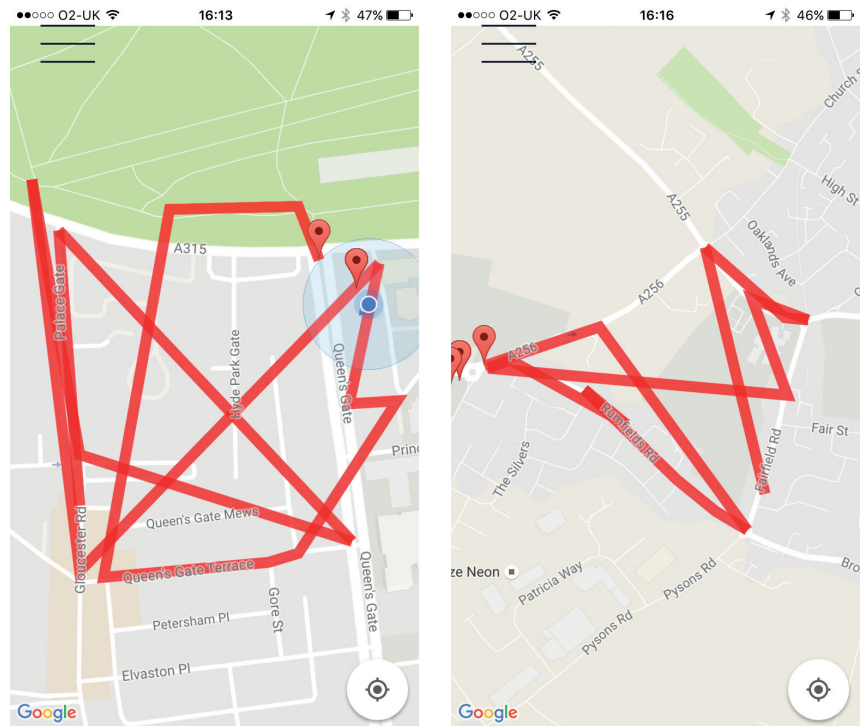


366 Kate McLean, 'Smellscaper Beta App Map', 2016 <<http://map.smellscaper.com/>> [accessed 23 January 2018].



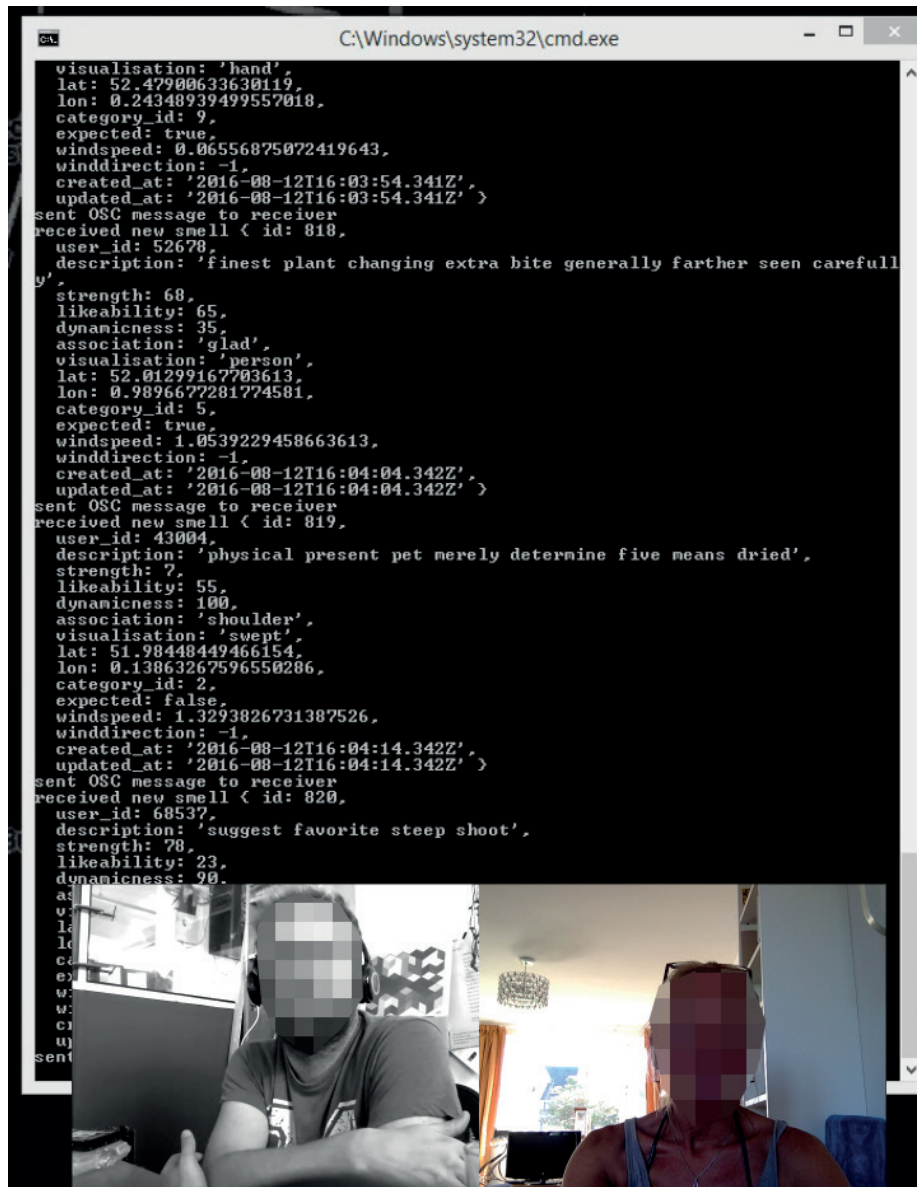
**Figure 6.5:** Original smell details recorded by the smellwalker (2016).  
Development:  
Dominik Beste

Less successful was the option for me to pre-programme smellwalks for end-users which resulted in unexpectedly glitchy routes (Figure 6.6), which remained unresolved.

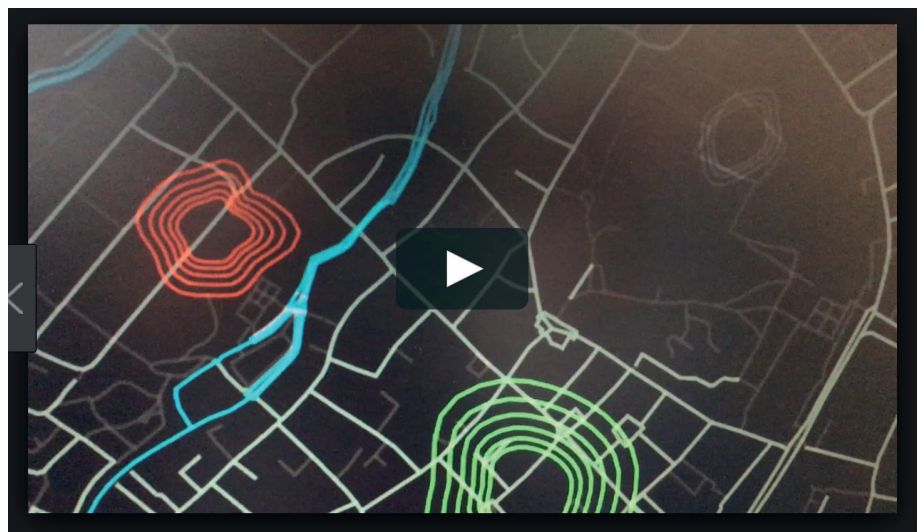


**Figure 6.6:** Pre-programming of smellwalks resulted in glitchy outcomes (2016). Development:  
Dominik Beste

Generating animated symbols directly from the Smellscaper database was again beyond my technical capabilities, but the developer and the projection mapper negotiated until it functioned (Figures 6.7



**Figure 6.7:** Coding development prototype for updated for live smellscape projection mapping (2016). Includes fields from the online smellnote database; smellwalker ID, description, strength, likeability, dynamicness, association, latitude, longitude, category\_id, expected, windspeed, winddirection. Development: Pete Wallace

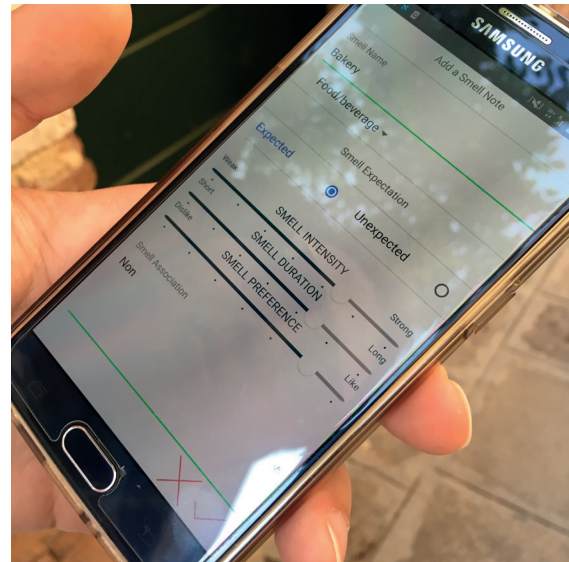


**Figure 6.8:** Prototype smellscape projection mapping (2016). Screen grab from recorded video. Development: Pete Wallace



and 6.8).<sup>367</sup> By this point I had depleted the allocated budget, however this work demonstrates potential to be re-activated through future, funded, multidisciplinary research collaboration.

I field-tested *Smellscaper v.2* with participants at *Charting the Digital Conference* in Venice in October 2016, setting up a pre-designed route for smellwalkers to follow and digitally record their smellnotes (Figure 6.9).<sup>368</sup>



**Figure 6.9:** Smellscaper app smellnote in the process of being recorded. Venice smellwalk (2016). Development: Dominik Beste

Post-walk feedback indicated several areas for consideration:

- inclusion of offline mode for phones without cell connection;
- alert prior to smellnote submission of any blank data fields, permitting users to choose to ignore or complete them;
- redesign and testing to ensure interface sat well within screen size;
- smellwalker smellnote trails to appear as pop-ups on smellwalk route to provide feedback while undergoing the activity;

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367 Examples of tests 1 – 7 are available online showing smell appearance, disappearance, movement, superimposition:

Test 1 <https://vimeo.com/252351939>

Test 2 <https://vimeo.com/252352550>

Test 3 <https://vimeo.com/252353406>

Test 4 <https://vimeo.com/252354516>

Test 5 <https://vimeo.com/252354997>

Test 6 <https://vimeo.com/252355056>

Test 7 <https://vimeo.com/252358877>

368 Sybille Lammes, Chris Perkins, Sam Hind, and others, *Charting the Digital: Discourse, Disruption, Design, Detours. Conference Proceedings* (Venice: University of Warwick, 8 October 2016) <<https://iris.unipa.it/retrieve/handle/10447/228789/419091/CTD%20Conference%20Proceedings%202016.pdf>> [accessed 23 January 2018].

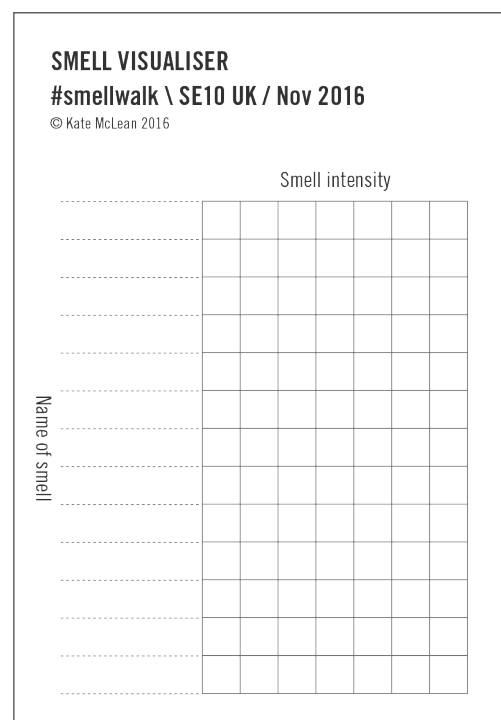
- greater use of the 'association' comment data field for freeform text (the testers really wanted to make more of this);
- option to deviate from a prescribed route.

I walked with four app users at various points during the test and observed how the digital process disrupted the usual rhythms and flows of the walk; meandering, ambulatory, sniffing practices diminished in favour of technical functionality prompting users to greater precision in locating sources and naming smells. More of a concern was how the app altered the smellwalk from a group experience, that encouraged physical sharing of smell experience, to become a solo activity in which recording took preference over communication.

In summary, the above tests indicate both success in functionality and proof of concept of *Smellscaper* as a digital smellnote app. The next step is to secure funding and a team to develop it in line with the overall philosophy of the project. My priority is for smellwalkers to enjoy the practice of walking nose-first, and secondly that they learn something new about themselves and their environment through doing so. Ultimately the app might commence as a tool for data collection.

## 6.6 Recent developments and the future of *smellscape mapping*

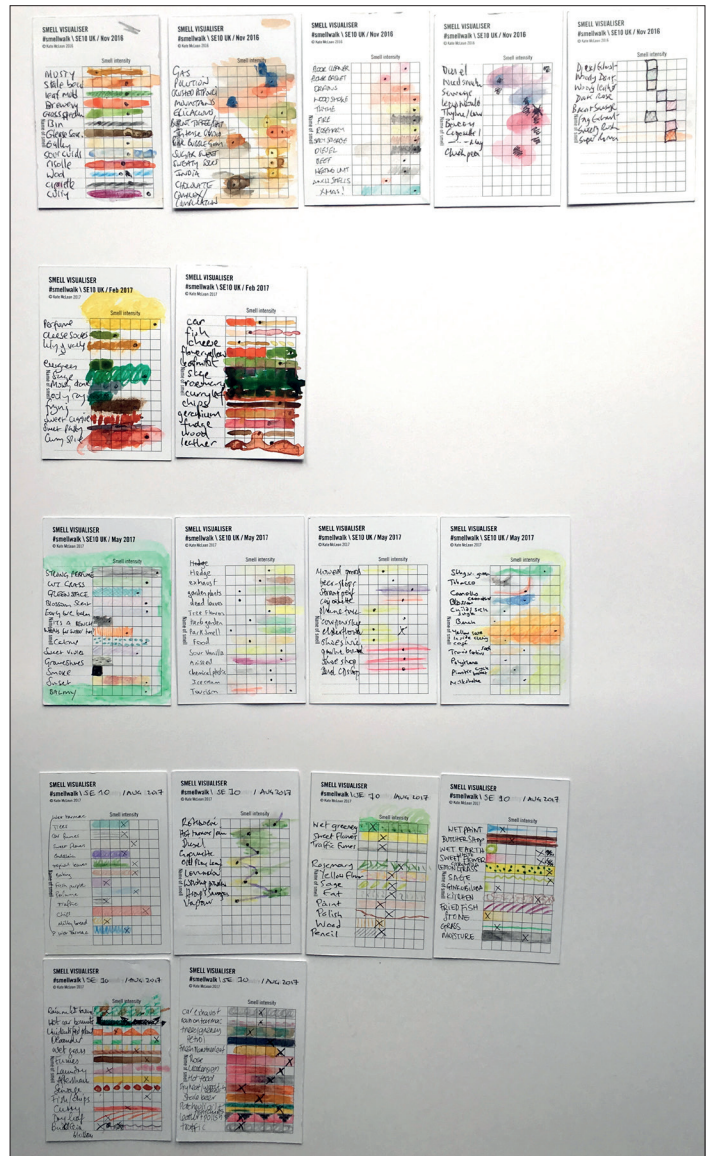
When I designed a system for scentwalkers in Singapore to select scent colours I was driven by a desire to represent a local perception. In Kyiv I requested participants to smellsketch (see Chapter Five). Building on these practices, I developed a Smell Visualiser printed grid (Figure 6.10)



**Figure 6.10:** Smell Visualiser; used to compare seasonal smell perceptions in Greenwich, UK (2016 – 2017). Shown at full size

and encouraged smellwalkers to perform sensory translations of their own, which in turn stimulated conversations about the commonalities and individuality of smell perception. I used Smell Visualisers in 2016/2017 to compare the seasonal smell-colour association in London's Greenwich smellscape (Figures 6.11 and 6.12).

**Figure 6.11:** Results from using Smell Visualiser to compare seasonal smell perceptions in Greenwich, UK (2016 – 2017) Top row: Autumn, second row: Winter, third row: Spring, bottom row: Summer

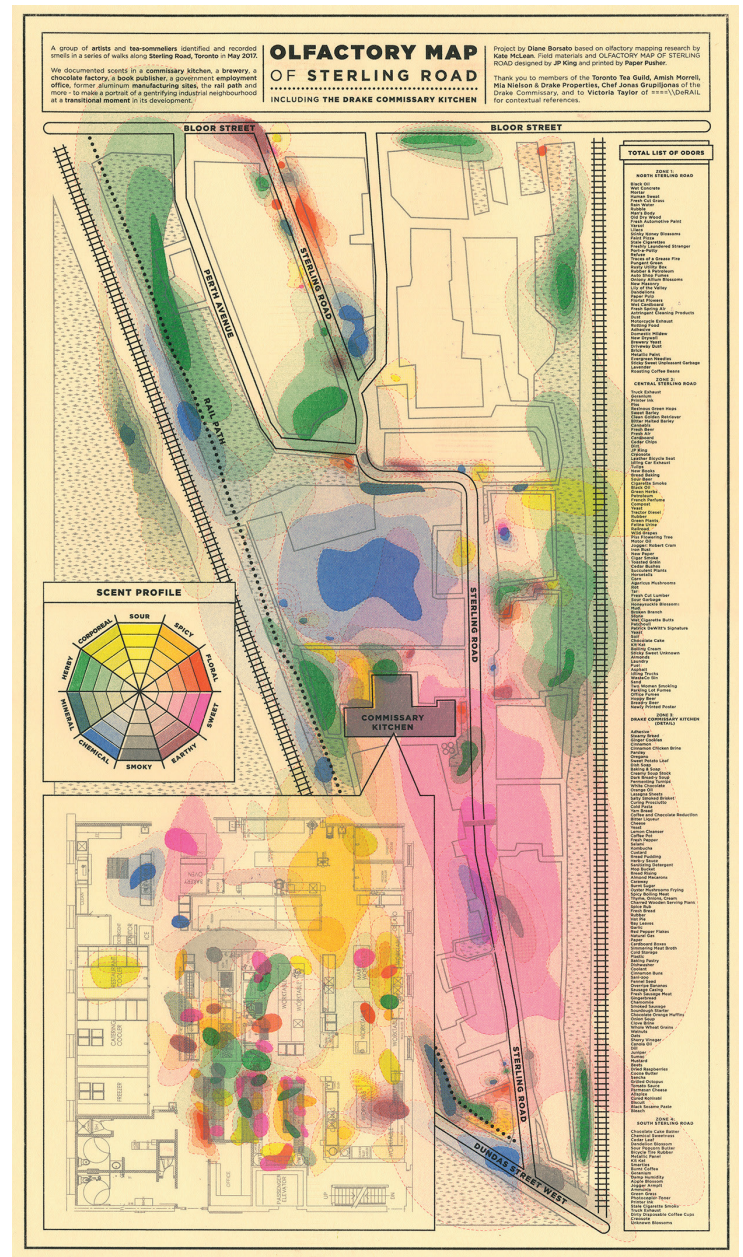


**Figure 6.12:** Results from using Smell Visualiser – summer 2017, Greenwich, UK

An interesting offshoot was the adaptation by a third party of the smell visualiser for use in perfume and wine appreciation classes in Canada. In this particular case the smell visualiser acted as an alternative, experimental communication, in addition to traditional use of verbal descriptors and aroma classification wheels.<sup>369</sup>

NAME OF SMELL:		SITE #	
SOURCE:			
NOTES:		ACTIVE	PASSIVE
SCENT PROFILE		INTENSITY	

**Figure 6.13:** Olfactory mapping Sterling Road, Toronto smellnote (2017). Design: JP King



**Figure 6.14:** Smell-mapping Sterling Road in Toronto (2017). Commissioned by the Drake Commissary and based on sensory-mapping tools developed by UK artist and designer Kate McLean. Map design: JP King

369 Melanie McBride, 'Today I Guide-on-the-Sided Teacher Education Students from Japan's Urawa University through the Process of Creating 3 Custom Eau de Cologne.' [Twitter.Com/Ut0Kj5uXiB](https://twitter.com/MelanieMcBride/status/968989658263818240), @MelanieMcBride, 2018 <<https://twitter.com/MelanieMcBride/status/968989658263818240>> [accessed 4 March 2018]; CAPS Ontario, 'Playing with Aromas with Dr. Melanie McBride @IWEW\_Canadapic. Twitter.Com/HhrenCYSwi', @MelanieMcBride?Lang=en, 2018 <<https://twitter.com/MelanieMcBride?lang=en>> [accessed 4 March 2018].

The benefits of smell visualiser cards for non-specialist audiences is in their structured, sequential simplicity by using smell names and intensity information collected during the smellwalk. The smellwalker can visually interpret, through colour, and reinforce their own prior experience extending their willing self-exposure to the smellscape, which in turn engenders a new awareness of place. Similar to the imagined worlds of the Mappa Mundi, it is remarkably satisfying to create new worlds where none existed, even if they are as simple as a set of coloured squares on a grid.<sup>370</sup> Without formal education as to how to depict smells there are few inhibitions; you can't get it 'wrong' because there is no 'right'.

My smellscape mapping research is intended for practising designers, those familiar with uncertainty, creativity and experimentation who I anticipate would be able to take a similar approach – dissecting, documenting, visualising and comparing – and adapting the stages to depict smellscapes, and potentially other sensed data. This was tested in the spring of 2017 when I was approached by Toronto-based artist/designers, Diane Borsato and J.P. King.<sup>371</sup> While I did not have time to collaborate, I acted as advisor as they used the *Smellfie* kit to create bespoke smellnote booklets (Figure 6.13), lead smellwalks and use the data gathered to design a smellmap (Figure 6.14).<sup>372</sup> This project indicates how local groups might take ownership of their smellscapes using the skills of designers to disseminate smellscape mappings publicly.<sup>373</sup>

My ambition for the continuation of this research leads me to identify a number of related, iterative future projects based on the thesis findings. These include:

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370 West Midlands History.

371 Borsato, 'Smell Map of Toronto'.

372 Kate McLean, 'Smellfie', 2015 <[http://sensorymaps.com/wordpress/wp-content/uploads/2015/10/Smellwalk\\_Intro\\_Kit\\_%C2%A9KateMcLean\\_2015.pdf](http://sensorymaps.com/wordpress/wp-content/uploads/2015/10/Smellwalk_Intro_Kit_%C2%A9KateMcLean_2015.pdf)> [accessed 26 March 2016].

373 Full details of the Olfactory Mapping of Sterling Road, Toronto, including photographs from the smellwalk, can be seen on the artist's web site: <<https://www.dianeborsato.net/#/olfactorymapping/>>

- Establishing alternative forums and exploring new modalities for public dissemination of smell data. I am currently working with a ‘placecasting’ app to add granularity and specialist olfactory insight into specific locations through sound recordings enabling both in-situ and vicarious olfactory experiences of Greenwich, London;<sup>374</sup>
- Publication of a smellscape mapping book to include findings from this thesis. Currently my planned manuscript is structured according to two scales; space and time, from small-scale city-wide maps to the experience of single day in one specific location;<sup>375</sup>
- Undertake smellscape mapping projects in the global south and in rural locations globally to counter current geographic imbalances;
- Explore alternative, real-time, eye-visible collection and dissemination methods for smellscape mappings using contemporary technologies to engage wider audiences in appreciation of the nature of sensory perception and the possibilities of sensory communication;<sup>376</sup>
- Investigate online publication opportunities for smellscape mapping databases and promote interdisciplinary academic use for further research with the ultimate goal of securing partners and funding for a collaborative global smellscape project;<sup>377</sup>

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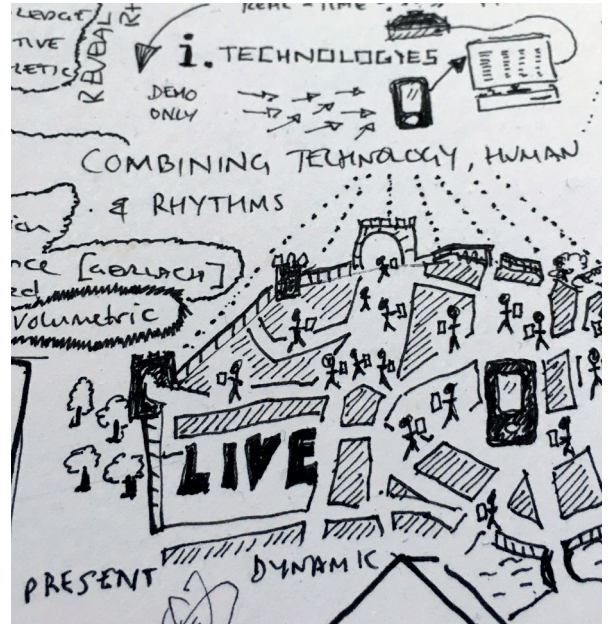
374 To do this I aggregated smellnotes from specific locations on a series of four, seasonal, Greenwich smellwalks and re-recorded them as narrative audio files. These audio stories, specific both to time and to place, are ready to be added to an app enabling visitors to London to witness the smellscape through the noses of others.

375 I have a book proposal submitted to LBA Books for a commercially-viable publication.

376 I am working with the Monell Center for Chemical Senses in Philadelphia towards a bid from Pew Centre for Arts & Heritage’s panel-adjudicated grants under their ‘Exhibition and public interpretation’ award scheme anticipating how the design of an interactive and immersive exhibition will be a catalyst for on-going conversations and dialogue on the nature of sensory perception and communication.

377 The data collected during the smellwalks is diverse and only partially used in my current smellscape mappings. Specialist analysis and interpretation of other smellwalk data (e.g. hedonic tone, language, associations) by social scientists, psychologists and built-environment specialists can add to existing knowledge as to how people make meaning from smell information leading to its greater application in future design projects. As such, design of scenarios for encountering the smellscape and its subsequent mapping as a spatial entity can be seen as a catalyst for further interdisciplinary study. A participatory, crowd-sourced, interdisciplinary study could attract funding for generating new knowledge about, and through smell, at the same time as producing datasets that would benefit from 4D mapping. This would enable simultaneous comparative studies to emerge as participatory artworks, combining people and technology to further appreciate the plurality of smell experience.

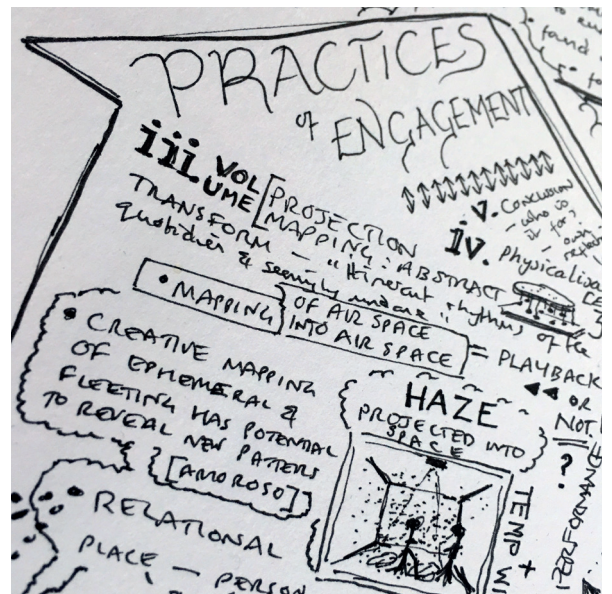
Learning gained from the projects featured above contribute to the development of funding bids for post-doctoral research. The projects provide both clear proofs of concept and successful testing of contemporary technologies. My aim to continue the work into mapping global smellscapes and submit incrementally-larger research proposals is inspired by a vision to create live, comparative, smellmapping projects across the globe, incorporating simultaneous detection and 4D smellmap as conceptualised in sketch form (Figure 6.15).



**Figure 6.15:** Future vision for live smellmapping using digital technologies (2018)

Based on the findings of this thesis, follow-on projects would be:

- Experienced individually through crowd-sourced events: with smellnotes collected using sympathetically-designed digital interface (*Smellscaper*)
- Smellscaper database connected through suitable interface to generate animated smellmaps of human experience drawing from human-perceived datasets for smell intensity and duration, and pulling wind direction and wind speed data directly from APIs;
- Disseminated in four-dimensional forms in which the viewer might walk through a collectively 'seen' smellscape in real time as the data are being collected and recorded elsewhere (Figure 6.16);
- Enabling comparative study as simultaneous, smellscape mappings.



**Figure 6.16:** Concept sketch of how a walk-through, animation-projection into a disco smoke-haze might generate 4D smellmapping (2018)

Future work, based on this concept, is designed to enrich debates and practices of world heritage; recording and highlighting olfactory contributions to place for contemporary, urban-living inhabitants who spend little time reflecting on the significance of olfactory experience in their everyday lives. It is a continuation of the findings from this thesis, expanded to a public audience.

## 6.7 *Summary*

In creating mappings of smellscapes I challenged the caution of their 'unmappability' as opined by Rodaway, and instead formed research questions to reveal and represent the nebulous fragmentary and episodic aspects of Porteous' theoretical smellscape.<sup>378</sup> In the structural design of the smellwalk, I considered olfaction as both a distance and proximal sense which served to highlight spatial, physical and durational characteristics of sensory experiences.<sup>379</sup> Through designed walking activities I created links between the eye-invisible smellscape and the specifics of place, as hundreds of smellwalkers sniffed the world. Through a deliberate checking of my own olfactory biases, I conducted my research through the subjective noses of others.<sup>380</sup>

This research entailed successive iterations, during which time I invented a series of repeatable and extensible practices. One final result is a conceptual model for the human-perceived smellscape (Figure 6.17) in which four key elements: sensory source, detectors (people), medium of transmission/detection (volumetric air), and descriptors (symbols) all possess and generate both spatial and temporal qualities. These four elements collectively constitute the smellscape; its perception, analysis and

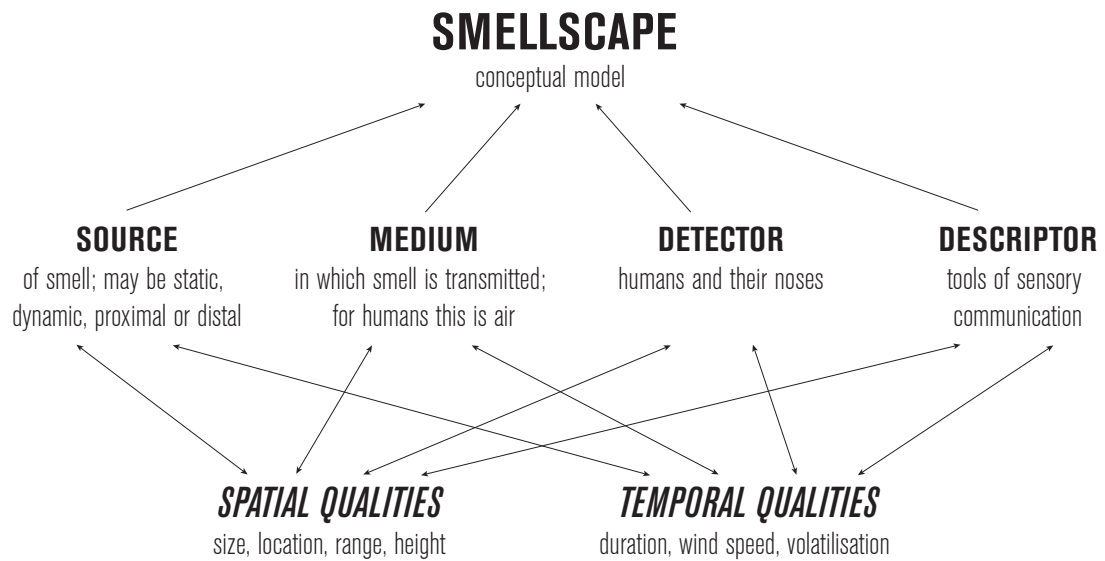
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378 Rodaway, p. 69; Porteous, p. 25.

379 Drobnick, 'Toposmia', p. 33.

380 Since I commenced my design practice of mapping cities through human senses in 2010 I have broadened the scope and the reach of the project through collaborations. It has been a pleasure to be able to work with smellwalkers from, and in, the UK, USA, Italy, Netherlands, Singapore, Spain, France and Ukraine. Every project and conversation contributed to my own understanding.





**Figure 6.17:** Elements and qualities of a human-perceived smellscape (2018)

communication, leading me to speculate how future smellscape mappings might henceforth be best disseminated across four-dimensions.

My original contribution to knowledge is a replicable set of tools and approaches that enable eye-invisible sensory data to become visible. I suggest how smell might be visualised through mapping to highlight its relationship with space, place, time and people. I achieve this through the practice, arising from two case studies based on data collected in Singapore and Kyiv as discussed earlier in this chapter. Through practice I activate the theorised fragmentary, ephemeral and qualitative aspects of a highly-nuanced sense.

Smellscape mapping practices make use of the map's greatest assets; its capacity to present multiple viewpoints through distorted perspectives and its capacity to hybridise knowledge in order to promote understanding of the existence and rich contribution of smells in everyday life.<sup>381</sup> The map and the smellscape are conjoined and together provide 'a semblance of truth sufficient to procure for these shadows of imagination that willing suspension of disbelief for the moment, which constitutes poetic

381 Barbara Tversky, 'Visualizing Thought: Topics in Cognitive Science', *Topics in Cognitive Science*, 3.3 (2011), 499–535.

faith'.<sup>382</sup> Thus the mappings and their participants work together in imagining potential tumbling, strands of diffusing, volatilising smell molecules moving through airspace in eddies and backflows of turbulence. Knowledge construction of the smellscape as eye-visible requires the participants to access a secondary imagination – one that 'enables individuals to transcend the primary imagination – not merely to perceive connections but to make them' as a new reality of an olfactory landscape emerges, and the smellmap depicts underexplored facets of our experienced world.<sup>383</sup>

This thesis demonstrates how representing smells in visual form conceives new spaces based on readily-perceivable, olfactory data. Using visual forms, sensory communication enables nuanced, olfactory experience to be shared amongst those who perceive it. In so doing, sensory communication design facilitates discussion of the contribution of olfaction to human experience and the contribution of smell to place, space and time. In rendering smellscape eye-visible, the complexity of their dynamic nature is enhanced.

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382 'Biographia Literaria by Samuel Taylor Coleridge', *The British Library* <<https://www.bl.uk/collection-items/biographia-literaria-by-samuel-taylor-coleridge>> [accessed 23 November 2017].

383 'Biographia Literaria by Samuel Taylor Coleridge'.

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# Appendices

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## *Appendix 1: Complete Smellwalk Log*

The following pull-out sections detail the smellwalks I have undertaken in building this body of work and specialist knowledge as my communication design practice. From 2010 until 2018 I have listed the locations, rationale, walks, weather conditions, resulting write-ups and personal learning resulting from each experience. The Smellwalk Log, an on-going reflection-on-action, is my reference guide, it informs every walk I do.

# Smellwalk Log



Longitude <https://mynasadata.larc.nasa.gov/latitudelongitude-finder/>

Smell-walk #	Project	Part	City	Neighborhood	Longitude	Airport code	Date	Time	Temp	Activity	Event	Leader(s)	Participants	Aim	Notes/Learning	Links
1	5	a	New York	Lower East Side, Manhattan	74.01° W	JFK	22/07/2011	02:00 PM	Insanely hot	Walk	MFA primary research	KM	0	Testing a methodology of exploration	Much olfactory space #smellnote #circularroute #reverse	<a href="http://ecastudent.blogspot.co.uk/2011/07/week-97-smelliest-block.html">http://ecastudent.blogspot.co.uk/2011/07/week-97-smelliest-block.html</a>
2	2	a	Glasgow	West End	4.25° W	GLA	29/10/2011	12:30 PM	Mild	Walk	MFA primary research	KM	0	Glasgow familiarisation	Hand-drawn sketch map as a record #smellnote #linear #temporality	<a href="http://sensorymaps.com/research/">http://sensorymaps.com/research/</a>
3	2	b	Glasgow	Barras	4.25° W	GLA	06/11/2011	01:00 PM	Cool	Walk	MFA primary research	KM	0	Primary research	First smell watercolour and smell-colour associations and history of Lorne Sausage #medium #temporality	<a href="http://ecastudent.blogspot.co.uk/2011/10/week-111-moving-on-to-barras.html">http://ecastudent.blogspot.co.uk/2011/10/week-111-moving-on-to-barras.html</a>
4	2	c	Glasgow	Argyll St	4.25° W	GLA	17/11/2011	02:00 PM	Dreich	Walk	Glasgow Herald Interview	KM	1	Primary research with Teddy Jamieson	Hanging odours of fast food #meteorology	<a href="http://ecastudent.blogspot.co.uk/2011/11/week-115-tale-of-two-cities-glasgow.html">http://ecastudent.blogspot.co.uk/2011/11/week-115-tale-of-two-cities-glasgow.html</a>
5	1		Edinburgh	Old Town to Bristo Sq.	3.19° W	EDI	15/12/2011	7:30 AM	Post-rain, cold	Walk	IASH Sensory Worlds Conference, Edinburgh	VH/ KM	8	KM learning / observing & route setting for conference delegates	Gritty reality of the present versus lyrical overview of a city. #temporality #guided	<a href="http://ecastudent.blogspot.co.uk/2011/12/week-118-smell-map-art-on-air.html">http://ecastudent.blogspot.co.uk/2011/12/week-118-smell-map-art-on-air.html</a>
6	2	d	Glasgow	Footie	4.25° W	GLA	15/01/2012	07:00 PM	Cold, damp	Drive	MFA primary research	KM	1	Primary research with Roz Carter	perfume for going out #social #conversation #car	
7	2	e	Glasgow	River Clyde	4.25° W	GLA	17/01/2012	03:00 PM	Cold	Boat trip	Glasgow Herald Interview	KM	4	Smell source collection / experience with 2 media & 2 GCC	fat lumps, piglet = human #conversation #boat #localexpert	<a href="http://ecastudent.blogspot.co.uk/2012/02/week-128-piglet-poo-and-potatoes-too.html">http://ecastudent.blogspot.co.uk/2012/02/week-128-piglet-poo-and-potatoes-too.html</a>
8	3	a	Manchester	City Centre	2.24° W	MAN	26/03/2012	11:00 AM	Dry	Walk	Smell & the City	VH	4	VH testing out group walks, KM testing the smellfie	Expelair - back alleys #multisensory #smellfie	<a href="https://smellandthecity.wordpress.com/2012/03/28/every-smell-has-a-story-to-tell-3-2/">https://smellandthecity.wordpress.com/2012/03/28/every-smell-has-a-story-to-tell-3-2/</a> <a href="file:///localhost/message/%253C201604201552_u3KF1xh005865@web1.cowbird.com%253E">file:///localhost/message/%253C201604201552_u3KF1xh005865@web1.cowbird.com%253E</a> <a href="http://ecastudent.blogspot.co.uk/2012/04/week-136-building-blocks.html">http://ecastudent.blogspot.co.uk/2012/04/week-136-building-blocks.html</a>
9	3	b	Manchester	City Centre	2.24° W	MAN	03/05/2012	11:00 AM	Dry	Walk	Smell & the City	VH	20	Representing smell workshop	4 groups very different perceptions #prewalk #marketing	<a href="http://ecastudent.blogspot.co.uk/2012/05/week-139-smell-in-city-workshop-part-2.html">http://ecastudent.blogspot.co.uk/2012/05/week-139-smell-in-city-workshop-part-2.html</a> <a href="https://smellandthecity.wordpress.com/2012/04/17/student-workshop-representing-smell-in-the-city-12/">https://smellandthecity.wordpress.com/2012/04/17/student-workshop-representing-smell-in-the-city-12/</a> <a href="https://smellandthecity.wordpress.com/2012/05/04/an-extraordinary-workshop-representing-smell-workshop-the-results-42-2/">https://smellandthecity.wordpress.com/2012/05/04/an-extraordinary-workshop-representing-smell-workshop-the-results-42-2/</a>
10	4	a	Newport	Harbor	71.31° W	NPT	16/06/2012	10:00 AM	Warm, breezy, dry	Walk	Friends of the Waterfront Harbor Walk	Teresa Crean	14	Primary exploration of Newport's smellscape via a local population	Smelltale - lobster bait #narrative #conversation #localexpert	<a href="http://ecastudent.blogspot.co.uk/2012/06/week-144-rhode-island-and-newport-smell.html">http://ecastudent.blogspot.co.uk/2012/06/week-144-rhode-island-and-newport-smell.html</a> <a href="http://ecastudent.blogspot.co.uk/2012/06/week-145-newport-harborwalk-aromas.html">http://ecastudent.blogspot.co.uk/2012/06/week-145-newport-harborwalk-aromas.html</a>
11	4	b	Newport	Bowen's Wharf	71.31° W	NPT	16/06/2012	12:00 PM	Dry, sunny	Sit	MFA primary research	KM	0	Research	#temporality #sit #passive	
12	4	c	Newport	Ocean Avenue	71.31° W	NPT	17/07/2012	02:30 PM	Dry, sunny	Cycle	MFA primary research	KM	5	Primary research	multiple words for ocean smells, no recording mechanism but lovely invitation #marketing #experience #localexpert	<a href="http://ecastudent.blogspot.co.uk/2012/07/week-150-smell-collecting.html">http://ecastudent.blogspot.co.uk/2012/07/week-150-smell-collecting.html</a>
13	4	d	Newport	Old Town	71.31° W	NPT	20/07/2012	03:00 PM	Wet, cool	Walk	MFA primary research	KM	12	Primary research	Recorded on beautiful maps in the rain. Bacon #smellnote	<a href="http://ecastudent.blogspot.co.uk/2012/07/week-150-smell-collecting.html">http://ecastudent.blogspot.co.uk/2012/07/week-150-smell-collecting.html</a>
14	5	b	New York	Greenwich Village	74.01° W	JFK	20/08/2013	02:00 PM	Hot	Walk	MFA primary research	KM	1	Re-testing methodology for NYC a block at a time with Miriam Songster	#smellnote #buddysystem	<a href="http://sensorymaps.blogspot.co.uk/2013/08/smellwalking-threshold-smells-of.html">http://sensorymaps.blogspot.co.uk/2013/08/smellwalking-threshold-smells-of.html</a>
15	6	a	Amsterdam	Upper Jordaan	4.90° E	AMS	16/04/2013	10:00 AM	Windy	Walk	Collaborative project w/ IFF	KM	1	Data collection	#passive	<a href="http://sensorymaps.blogspot.co.uk/2013/04/smellwalking-in-amsterdam.html">http://sensorymaps.blogspot.co.uk/2013/04/smellwalking-in-amsterdam.html</a>
16	6	b	Amsterdam	Lower Jordaan	4.90° E	AMS	16/04/2013	02:30 PM	Windy	Walk	Collaborative project w/ IFF	KM	12	Data collection	#active	

17	6	c	Amsterdam	Oud West	4.90° E	AMS	16/04/2013	04:30 PM	Windy	Walk	Collaborative project w/ IFF	KM	4	Data collection				
18	6	d	Amsterdam	De Pijp	4.90° E	AMS	17/04/2013	9:00 AM	Windy	Walk	Collaborative project w/ IFF	KM	6	Data collection	#mindfulness #re-see			
19	6	e	Amsterdam	Centraal	4.90° E	AMS	18/04/2013	10:00 AM	Windy	Walk	Collaborative project w/ IFF	KM	4	Data collection				
20	6	f	Amsterdam	Nieuwmarkt	4.90° E	AMS	18/04/2013	01:00 PM	Windy	Walk	Collaborative project w/ IFF	KM	4	Data collection	#unexpected			
21	6	g	Amsterdam	De Pijp	4.90° E	AMS	18/04/2013	04:00 PM	Windy	Walk	Collaborative project w/ IFF	KM	6	Data collection				
22	6	h	Amsterdam	Lower Jordaan	4.90° E	AMS	18/04/2013	07:00 PM	Windy	Walk	Collaborative project w/ IFF	KM	1	Data collection	#spokensmellnote #ephemerality #lostsmell			
23	6	i	Amsterdam	Oosterpark	4.90° E	AMS	19/04/2013	8:00 AM	Cool	Walk	Collaborative project w/ IFF	KM	1	Data collection	#unexpected #highthorse			
24	6	j	Amsterdam	De Pijp	4.90° E	AMS	19/04/2013	11:00 AM	Cool	Walk	Collaborative project w/ IFF	KM	4	Data collection				
25	6	k	Amsterdam	Amstel & 7 Bridges	4.90° E	AMS	19/04/2013	02:00 PM	Cool	Walk	Collaborative project w/ IFF	KM	11	Data collection				
26	7	a	Paris	Place du Tertre	2.35° E	CDG	11/07/2013	08:30 PM	Warm	Walk	Five Nights Book research w/ John Baxter	KM	1	Book research	#sanctity #materiality #visualcue	<a href="http://rcaied.tumblr.com/post/55809938380/smell-research-paris-john-baxter-needed-a">http://rcaied.tumblr.com/post/55809938380/smell-research-paris-john-baxter-needed-a</a>		
27	7	b	Paris	Place de Clichy & Metro Ligne 2	2.35° E	CDG	12/07/2013	06:00 PM	Warm	Walk	Five Nights Book research w/ John Baxter	KM	1	Book research	#restorative			
28	7	c	Paris	Place Maubert-Mutualité	2.35° E	CDG	13/07/2013	01:00 PM	Warm	Walk	Five Nights Book research w/ John Baxter	KM	1	Book research	#cultural #transferablesmells			
29	7	d	Paris	Pigalle	2.35° E	CDG	14/07/2013	03:30 PM	Warm	Walk	Five Nights Book research w/ John Baxter	KM	1	Book research	#sin			
30	8		Boston	North End / Boston Common	71.06° W	BOS	11/08/2013	5:30 pm	Warm	Walk	Radio Interview NPR / Rhode Island	KM	8	Discover anew	#pleasantsurprise #goodsmells	<a href="http://sensorymaps.blogspot.co.uk/2013/08/multi-sensory-boston.html">http://sensorymaps.blogspot.co.uk/2013/08/multi-sensory-boston.html</a>	<a href="http://www.analisamentmentblog.com/scent-and-the-city-urban-planning-using-smellscapes/">http://www.analisamentmentblog.com/scent-and-the-city-urban-planning-using-smellscapes/</a>	<a href="http://www.pri.org/stories/2014-05-13/graphic-designer-makes-smell-maps-cities-around-world">http://www.pri.org/stories/2014-05-13/graphic-designer-makes-smell-maps-cities-around-world</a>
31	5	c	New York	Brooklyn	74.01° W	JFK	10/09/2014	6:30pm	Hot	Walk	NY Times interview / walk	KM	20	Add a new hood to the NYC maps	#buddysystem #contestation	<a href="http://sensorymaps.blogspot.co.uk/2014/09/smell-colour-of-brooklyn-block.html">http://sensorymaps.blogspot.co.uk/2014/09/smell-colour-of-brooklyn-block.html</a>		
32	9		Theddingworth, Leics	Hothorpe Hall	1.02° W	EMA	05/09/2013	01:00 PM	Warm	Walk/sit	Workshop BCS	KM	6	Methodological comparison	#smellexploration			
33	10		London	Earl's Court	0.13° W	LHR	28/11/2013	10:00 AM	Cold	Walk	Workshop GeoDATA	KM	10	Research mapping techniques of others to immediate smellscape	#drawingsmell #cold			
34	9	a	Vancouver	Robson Square	123.12°W	YVW	18/01/2014	03:00 PM	Cold	Walk	Design Principles & Practices Conference	VH	6	Shared research experience	You know the drill! #initialspiel #smellfie			
35		b	Vancouver	Granville Island	123.12°W	YVW	19/01/2014	01:00 PM	Cold	Walk	Design Principles & Practices Conference	KM	6	Understanding place	Trying to sniff for 3 hours is not productive! #toolong			
36	10		London	Bloomsbury	0.13° W	LHR	23/01/2014	02:00 PM	Cold, damp	Walk	BBC Radio 4	VH & KM	1	BBC Radio 4 Interview of process				
37	11		London	Victoria	0.13° W	LHR	04/02/2014	12:30 PM	-	Walk	GeoPlace collaboration	KM	3	To test the Smellfie kit	#smellfie #complex #timeconsuming	<a href="http://sensorymaps.blogspot.co.uk/2014/02/sensory-research-smellwalk-selfie.html">http://sensorymaps.blogspot.co.uk/2014/02/sensory-research-smellwalk-selfie.html</a>		
38	12		Dunkerque	Port	2.38° E	CQF	15/03/2014	01:00 PM	Warm	Walk	Primary research: smell-sketching	KM	0	Smell sketching	#brickeffect #smellasexperience #paint #water-colour			
39	13		Narbonne	Centre	3.05° E	XNA	17/04/2014	07:00 PM	Warm	Walk	Primary research: smell-sketching	KM	0	Smell sketching	#smellshape #marijuana #sharp #jagged			

40	14		Canterbury	City Centre	1.08° E	MSE	04/06/2014	12:30 PM	Cool, breezy	Walk	Internship Team Building / Beaney	KM	4	Research for 2 Canterbury Smells	#length	<a href="http://sensorymaps.blogspot.co.uk/2014/06/hacking-perfume-methods.html">http://sensorymaps.blogspot.co.uk/2014/06/hacking-perfume-methods.html</a>		
41	15		Tromso	Centre	18.96° E	TOS	21/06/2014	03:00 PM	Cool	Walk	Primary research: smell-sketching	KM	0	Smell sketching	#unexpected	<a href="http://sensorymaps.blogspot.co.uk/2014/08/a-town-in-norways-arctic-circle.html">http://sensorymaps.blogspot.co.uk/2014/08/a-town-in-norways-arctic-circle.html</a>		
42	16	a	Ellesmere Port	Arcades Shopping Centre	2.90° W	LPL	25/07/2014	10:00 AM	Warm	Walk	Community Public Art Project	KM	0	Public Art project	#smellcolour #smellshape #masks #play	<a href="http://sensorymaps.blogspot.co.uk/2014/09/hounds-on-scent-ellesmere-port-research.html">http://sensorymaps.blogspot.co.uk/2014/09/hounds-on-scent-ellesmere-port-research.html</a>		
43	16	b	Ellesmere Port	Rivacre Country Park	2.90° W	LPL	25/07/2014	02:00 PM	Warm	Walk	Community Public Art Project	KM	7	Public Art project	#masks #restorative #play			
44	16	c	Ellesmere Port	Whitby Road	2.90° W	LPL	26/07/2014	10:00 AM	Warm	Walk	Community Public Art Project	KM	1	Public Art project	#visuals #makerstudio			
45	17	a	Amsterdam	Oud West (interior)	4.90° E	AMS	27/09/2014	10:00 AM	Interior	Walk	De Hallen library project	KM	8	Stimulate youth interest	smelling inside a library and inside the books is another entire project			
46		b	Amsterdam	Oud West (interior)	4.90° E	AMS	27/09/2014	02:00 PM	Interior	Walk	de Hallen library project	KM	10	Stimulate youth interest	done with young children (aged 9) this was difficult to manage in a foreign language. Attention span was very short-lived - maybe 15 mins - walks need greater structure but arcade proved smells can be found anywhere			
47	18	a	Pamplona	Ensanche	1.65° W	PNA	26/10/2014	11:00 AM	Warm	Walk	Mapamundistas	KM	12	Collection of individual smells for motion graphic smellmap for commissioned artwork	#translation	<a href="http://sensorymaps.com/portfolio/smellmap-pamplona/">http://sensorymaps.com/portfolio/smellmap-pamplona/</a>		
48	18	b	Pamplona	Mendillori	1.65° W	PNA	27/10/2014	05:00 PM	Warm	Walk	Mapamundistas	KM	14		#embodied #active			
49	18	c	Pamplona	Casco Viejo	1.65° W	PNA	28/10/2014	11:00 AM	Warm	Walk	Mapamundistas	KM	15		#sensorydeprivation			
50	18	d	Pamplona	Barrio Universidad	1.65° W	PNA	29/10/2014	12:15 PM	Warm	Walk	Mapamundistas	KM	9		walk where cooking smells elicited a long discussion as to what was being prepared... smell without visual forced greater olfactory analysis			
51	18	e	Pamplona	Casco Viejo	1.65° W	PNA	29/10/2014	07:00 PM	Warm	Walk	Mapamundistas	KM	8					
52	19		Paris	rue Vavin	2.35° E	CDG	12/11/2014	11:00 AM	Cool	Walk	IEEE VISAP Conference	KM	7	Data vis exploration	#syntheticheadache #unexpected			
53	20		London	Bloomsbury	0.12° W	LHR	08/12/2014	02:00 PM	Cold	Walk	Smellscaper App	KM	5	App developer to understand the atmosphere and pace of a smellwalk	#mindfulness #re-see			
54	21		Edinburgh	Bristo Square/Mosque	3.19° W	EDI	02/02/2015	10:00 AM	Cold	Walk	Sensory Geographies w/ Edi Uni	KM	15	Undergraduate experiential module - demonstrating a methodology				
55	22	a	Paris	rue Vavin	2.35° E	CDG	09/02/2015	03:00 PM	Cold	Walk	w/ P+G	KM	6	Test route w/client				
56	22	b	Paris	rue Vavin	2.35° E	CDG	10/-2/2015	11:00 AM	Cool	Walk	w/ International bloggers	KM	24	Alternative ways of knowing / product launch based on 'problem of habituation'	#groupsize			
57	23		Marseille	n/a	5.37° E	MRS	18/02/2015	02:00 PM	Warm & dry	Walk	Interdisciplinary Smell-mapping Workshop	KM	48	Design methodology / ex-forming the city and the map	Used cascade learning to pass information down through large groups. Some used blindfolds to determine smellscapes. Fabulous 3D visualisations	<a href="http://sensorymaps.blogspot.co.uk/2015/03/smellscape-mapping-marseille.html">http://sensorymaps.blogspot.co.uk/2015/03/smellscape-mapping-marseille.html</a>	<a href="http://sensorymaps.com/portfolio/smellscape-mapping-marseille/">http://sensorymaps.com/portfolio/smellscape-mapping-marseille/</a>	<a href="https://vimeo.com/140280687">https://vimeo.com/140280687</a>
58	24		Gozo	n/a	14.25° E	GZM	28/03/2015	01:00 PM	Warm & damp	Walk	Go-Go-Gozo Interdisciplinary Field Trip	KM	40	Playful research methodology	#play #smelltosound			
59	20		London	Bloomsbury	0.12° W	LHR	16/04/2015	02:00 PM	Cool	Walk	Smellscaper App	Tina Fahall	5	App user testing	#works			

60	25		London	Kensington	0.19° W	LHR	19/05/2015	01:00 PM	Cool	Walk	with Marloes Hagenaars	KM	1	Experiential interview		<a href="http://www.basenotes.net/features/3167-smell-and-the-city">http://www.basenotes.net/features/3167-smell-and-the-city</a>	
61	26	a	Singapore	Katong	103.82° E	SGA	03/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	17	PhD Data collection	exciting, busy, hot, #perfumehotel	<a href="http://sensorymaps.blogspot.co.uk/2015/08/scents-scented-research-in-urban-fields.html">http://sensorymaps.blogspot.co.uk/2015/08/scents-scented-research-in-urban-fields.html</a>	<a href="https://sensorymaps.com/portfolio/scentscape-06-2015-singapore/">https://sensorymaps.com/portfolio/scentscape-06-2015-singapore/</a>
62	26	b	Singapore	Katong	103.82° E	SGA	03/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	9	PhD Data collection	#humidnights		
63	26	c	Singapore	Kampong Glam	103.82° E	SGA	04/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	12	PhD Data collection	#chineseherbs #singaporepharmacysmell		
64	26	d	Singapore	Kampong Glam	103.82° E	SGA	04/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	7	PhD Data collection	#shisha #carbatterryBO		
65	26	e	Singapore	Chinatown	103.82° E	SGA	05/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	12	PhD Data collection	first sniff of #durian		
66	26	f	Singapore	Chinatown	103.82° E	SGA	05/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	7	PhD Data collection	#incense		
67	26	g	Singapore	Sentosa	103.82° E	SGA	06/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	4	PhD Data collection	#cinnamontrees		
68	26	h	Singapore	Sentosa	103.82° E	SGA	06/06/2015	07:00 PM	Hot humid	Walk	Singapore 50th	KM	6	PhD Data collection	#fastfood		
69	26	i	Singapore	ECP	103.82° E	SGA	07/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	5	PhD Data collection	views of anchored cargo ships – anachronous		
70	26	j	Singapore	ECP	103.82° E	SGA	07/06/2015	07:00 PM	Hot humid	Walk	Singapore 50th	KM	6	PhD Data collection			
71	26	k	Singapore	Gardens by the Bay	103.82° E	SGA	08/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	30	PhD Data collection	fake environment revealed though lack of smell		
72	26	l	Singapore	Gardens by the Bay	103.82° E	SGA	08/06/2015	06:30 PM	Hot humid	Walk	Singapore 50th	KM	24	PhD Data collection	you can neither curate nor control smells		
73	26	m	Singapore	Gardens by the Bay	103.82° E	SGA	08/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	22	PhD Data collection	smellwalk for “date night”		
74	26	n	Singapore	Little India	103.82° E	SGA	09/06/2015	10:00 AM	Hot humid	Walk	Singapore 50th	KM	11	PhD Data collection	#wetmarket #meat		
75	26	o	Singapore	Little India	103.82° E	SGA	09/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	7	PhD Data collection	#techtown and #jasmine meet		
76	26	p	Singapore	Orchard Road	103.82° E	SGA	10/06/2015	11:00 AM	Hot humid	Walk	Singapore 50th	KM	15	PhD Data collection	Embassy flowers		
77	26	q	Singapore	Orchard Road	103.82° E	SGA	10/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	10	PhD Data collection	#hardlife		
78	26	r	Singapore	Orchard Road	103.82° E	SGA	11/06/2015	08:00 PM	Hot humid	Walk	Singapore 50th	KM	12	PhD Data collection			
79	26	s	Singapore	Tao Payoh	103.82° E	SGA	11/06/2015	03:00 PM	Hot humid	Walk	Singapore 50th	KM	9	PhD Data collection	VI groups use smell as #verification sense		
80	27		Compton Verney	Lake and grounds	1.32° W	CmV	20/06/2015	12:00 PM	Warm, breezy	Walk	ALSO Festival	KM	8	Humanities festival	Dogs are welcome additions to smellwalks		
81	28		London	Holborn	0.13° W	LHR	06/07/2015	05:00 PM	-	Walk	Designing w/Scents	KM	14	Alternative experience to perfumery	Sniffing the biker in full leathers - ask permission	<a href="https://twitter.com/NicolaPozzani/status/715086669188374528">https://twitter.com/NicolaPozzani/status/715086669188374528</a>	
82	29		Whitstable	Harbour St / Beach Walk	1.02° E	Whl	31/08/2015	06:30 PM	Cool	Walk	Museum of Fun	KM	6	Artist walk	Smell of council buildings / offices		
83	30		Folkestone	Harbour front	1.17° E	FkS	24/10/2015	12:00 PM	Cool	Walk	Triennial	KM	4	Artist walk	Strangely disappointing		
84	31		Guildford	Uni of Surrey	0.57° W	LGW	01/11/2015	11:00 AM	Cold	Walk	Fifth Sense Conference	KM	8	Facilitate sharing of smells between the olfactive and the challenged	#paired #buddy	<a href="http://sensorymaps.blogspot.co.uk/2016/01/anosmics-hyposmics-and-normosmics.html">http://sensorymaps.blogspot.co.uk/2016/01/anosmics-hyposmics-and-normosmics.html</a>	<a href="https://vimeo.com/156441381">https://vimeo.com/156441381</a>
85	32		London	Kensington	0.19° W	LHR	21/11/2015	03:00 PM	Cold	Walk	Being Human Festival	KM	14		#paired #buddy	<a href="https://storify.com/katemclean/consider-smell">https://storify.com/katemclean/consider-smell</a>	
86	33		Edinburgh	n/a	3.19° W	EDI	02/03/2016	-	Unknown	Walk	Sensory Geographies course	n/a	11	Test out the smellie kit	#minusKate the results were possibly less detailed but still the experience resulted in completed smellnotes	<a href="https://twitter.com/NinaJM/status/704986631607066624">https://twitter.com/NinaJM/status/704986631607066624</a>	
86	34		London	Holborn	0.11° W	LHR	05/04/2016	05:00 PM	Cool with showers	Walk	Design with Scents course at LCF, UAL	KM	8	Inquisitive scent experience / nose training in the field	pungency of the lily - cannabis / BO		
87	24		Gozo	Victoria / Rabat	14.25° E	MLA	06/05/2016	11:00 AM	Hot and dry	Walk	Go-Go-Gozo Interdisciplinary Field Trip	n/a	32	Playful methodology workshop			
88	35	c	Whitstable	Harbour St / Beach Walk	1.02° E	Whl	06/06/2016	04:00 PM	Warm & dry	Walk	Whitstable Biennale	KM	10		Doughnuts - word cloud visualisation		
89	35	a	London	Peckham	0.12° W	LHR	02/07/2016	10:00 AM	Warm	Walk	Southwark Council - fitness & placemaking	KM	10	Commissioned walk by Southwark Council	Done in conjunction with Chris Wood – sound walks – an interesting combination of sequential single modality. Chris selects specific sites of potential sounds for active listening. This is something I could add in to the smellwalk in addition to the sections		
90	35	b	London	Peckham	0.12° W	LHR	02/07/2016	12.30 pm	Warm	Walk	Southwark Council - fitness & placemaking	KM	8	Commissioned walk by Southwark Council			
91	35	c	London	Peckham	0.12° W	LHR	02/07/2016	03:00 PM	Warm	Walk	Southwark Council - fitness & placemaking	KM	9	Commissioned walk by Southwark Council			



92	36		Venice	Cannaregio	12.33° E	VCE	07/10/2016	03:00 PM	Warm and dry	Walk	Charting the Digital Conference	KM	12	Test App for functionality	Loads - Jana particularly helpful				
93	37		London	Kensington	0.19° W	LHR	19/11/2016	1.30 pm	Cold and dry	Walk	Being Human Festival	KM	10	Hope/fear & the transhuman - test out Smell visualiser	Sound recorded by Jan Peytrek. Smell visualisers have much potential - movement from general description to specific, hue and tone of smell colour				
94	38	a	London	Greenwich	0.01° W	LHR	29/11/2016	10:00 AM	Cold, sunny, dry	Walk	Museum of Walking with Andrew Stuck and Katie <a href="http://www.museumof-walking.org.uk/">http://www.museumof-walking.org.uk/</a>	KM	8	Part 1 of seasonal - using smell visualiser	Smell visualiser worked well again. Need to retain these for future. Stances of smell note completion photo demonstrates a need to revise	<a href="https://twitter.com/GreenwichFlower/status/803595252863004672">https://twitter.com/GreenwichFlower/status/803595252863004672</a>	<a href="https://twitter.com/katemclean/status/803608554099785728">https://twitter.com/katemclean/status/803608554099785728</a>	<a href="https://twitter.com/katemclean/status/803562994156314625">https://twitter.com/katemclean/status/803562994156314625</a>	
95	39		Kiev	Maidan to Podil	30.52° E	IEV	25/12/2016	01:00 PM	Cold, damp, overcast	Walk	At request of data journalist Andriy Gazin	KM	12	Improvised and impromptu	Made use of the free smelling time as genuine roaming alone. Resulted in interesting approaches to smell (purely as intensity w/out description. Settling for coffee afterwards to draw and discuss works really well. Took it in turns to paint - quick, instinctive results. Attended by an anosmic on her own volition	<a href="https://twitter.com/ThomasPromomast/status/812978796840288256">https://twitter.com/ThomasPromomast/status/812978796840288256</a>	<a href="https://twitter.com/AndriyGazin/status/811579443957366784">https://twitter.com/AndriyGazin/status/811579443957366784</a>	<a href="http://sensorymaps.blogspot.co.uk/2016/12/vitality-sensuality-humanity-impromptu.html">http://sensorymaps.blogspot.co.uk/2016/12/vitality-sensuality-humanity-impromptu.html</a>	<a href="http://sensorymaps.com/portfolio/a-winter-smellwalk-in-kyiv/">http://sensorymaps.com/portfolio/a-winter-smellwalk-in-kyiv/</a>
96	40		London	Marylebone	0.15° E	LHR	21/02/2017	01:00 PM	Cool, cloudy, 11° C	Walk	BBC Radio 4 on nose as tool for detection of air pollution with Matt McGrath	KM	1	Recording for radio 'solutions' series due to go out early March 2017	Intro text revised - "sniffing isn't smelling" & 3 stages: notice a smell, differentiate from other smells, name it (taken from Horowitz) - smell of snowdrops	<a href="http://www.bbc.co.uk/news/science-environment-39179098">http://www.bbc.co.uk/news/science-environment-39179098</a>			
97	38	b	London	Greenwich	0.01° W	LHR	28/02/2017	11.30 am	Cold, sunny, dry	Walk	Museum of Walking with Andrew Stuck and Katie <a href="http://www.museumof-walking.org.uk/">http://www.museumof-walking.org.uk/</a>	KM	8	Part 2 of seasonal - using smell visualiser	Smell visualiser worked well again. Difference in colour hue already.			<a href="https://twitter.com/katemclean/status/803562994156314625">https://twitter.com/katemclean/status/803562994156314625</a>	
98	41		London	Aldgate, E1	0.15° E	LHR	24/03/2017	2.30 pm	Indoor	Walk	Sensory Cities Conference	KM	60	Trial an indoor smellwalk and visualisation concentrating on binaries: smellcatching (faint/strong) & smellhunting (expected/unexpected)	Interesting smellsketching as an independent activity in an interior environment of academics. General levels of bemusement and engagement	<a href="https://twitter.com/MoniDegen/status/845281173291094017">https://twitter.com/MoniDegen/status/845281173291094017</a>	<a href="https://twitter.com/alexrhystaylor/status/845285055413047296">https://twitter.com/alexrhystaylor/status/845285055413047296</a>		
99	42		Margate	Seafront	1.39° E	MSE	13/04/2017	02:00 PM	Dry, sunny 14° C	Walk	SKY News recorded event	KM	1	Recording for SKY News over Easter Bank holiday weekend with Tom Cheshire (focus on technology)	News teams really like stinky... and they like to focus on 'sensational' smells of disgust such as bins. In effect there are many component whiffs that emanate from a single, large source	<a href="https://twitter.com/NortonTrip66/status/853864094428000256">https://twitter.com/NortonTrip66/status/853864094428000256</a>	<a href="http://news.sky.com/story/smells-capes-mapping-the-whiffs-of-the-town-and-city-10840380">http://news.sky.com/story/smells-capes-mapping-the-whiffs-of-the-town-and-city-10840380</a>		
100	43		Peterborough	Bretton Green	0.24° W	NQT	22/04/2017	10.25 am	Partly sunny, 14° C	Walk	Discover Bretton funded arts project	KM	16	To reconnect with local environment. Community engagement	Kids worked in tandem with adults where the kids did the smelling and the adults recorded forging family bonds. All ages and abilities were involved in this community engagement project. All participated in smell visualisation (some coloured over their text - maybe this needs an example?)	<a href="https://twitter.com/katemclean/status/855663223357485056">https://twitter.com/katemclean/status/855663223357485056</a>	<a href="https://twitter.com/katemclean/status/855793013574053892">https://twitter.com/katemclean/status/855793013574053892</a>	<a href="https://twitter.com/katemclean/status/855794173458427904">https://twitter.com/katemclean/status/855794173458427904</a>	<a href="https://brettongreens.wordpress.com/2017/04/24/what-does-bretton-smell-of/">https://brettongreens.wordpress.com/2017/04/24/what-does-bretton-smell-of/</a>
101	44	a	New York City	Astor Place	74.01° W	JFK	26/04/2017	2.30 pm	-	Walk	NYC DOT Summer Streets	Courtney Whitelocke	18	Primary research	Video links work as a guide but my presence is missed! Detailed and wonderfully evocative descriptors	<a href="http://sensorymaps.com/portfolio/summer-streets-smellmapping-astor-place-nyc/">http://sensorymaps.com/portfolio/summer-streets-smellmapping-astor-place-nyc/</a>			
102	45		Rabat/Victoria, Gozo	City Centre	14.25° E	MLA	05/05/2017	11:00 AM	Hot and dry	Walk	GoGoGozo Field Trip	KM	9	Playful methodology workshop	Smellmapping always gets the fewest participants but the most passionate converts				
103	44	b	New York City	Astor Place	74.01° W	JFK	09/05/2017	2.30 pm	-	Walk	NYC DOT Summer Streets	Courtney Whitelocke	6	Primary research	Fill-in detail for map - very detailed				

104	46	c	London	Greenwich	0.13° W	LHR	23/05/2017	11.30 am	-	Walk	Sense Safari w/ Andrew Stuck	KM	4	Part 3 of seasonal - using smell visualiser				
105	47		London	Bloomsbury	0.13° W	LHR	05/07/2017	3.30 pm	Dry, breezy, hot and sunny 26°C	Walk	Wellcome Collection Urban "Nature Wanders" series	KM	21	Commissioned walk by Natalie Coe at Wellcome Collection	Re-orienting to focus on the nature aspect was interesting but slowed the group down. The expectation on a signed-up 'tour' means that the group needs to be led and looks to the leader for cues as to when to move. Facilitators essential	<a href="https://wellcomecollection.org/events/nature-wanders-smellwalk">https://wellcomecollection.org/events/nature-wanders-smellwalk</a>	<a href="https://twitter.com/SensoryTrust/status/884430786006593536">https://twitter.com/SensoryTrust/status/884430786006593536</a>	<a href="https://twitter.com/katemclean/status/882561602515554304">https://twitter.com/katemclean/status/882561602515554304</a>
106	48		Manchester	MMU campus	2.24° W	MCR	11/07/2017	04:00 PM	Cool, wet ground, rain, 17°C	Walk	GoGoGozo dissemination conference	KM	14	Part of dissemination of activity	Added in a taste element and introduced retronasal smell activity as part of smell hunting - excellent experiential novelty but requires acquiescent participants who are not fearful	<a href="https://twitter.com/katemclean/status/885032291789148160">https://twitter.com/katemclean/status/885032291789148160</a>	<a href="https://twitter.com/MoozhanShakeri/status/884797526418878466">https://twitter.com/MoozhanShakeri/status/884797526418878466</a>	
107	49	a	London	Somerset House Courtyard	0.13° W	LHR	17/07/2017	12:00 PM	Sunny, breezy	Trial walk, venue scouting	Prep for Synaesthesia Lates	KM	0	Find and photograph locations for smellwalk video to enable independent smellwalking on site	Take more photos than you think you need... this moview business is a different realm all together	<a href="https://www.somerset-house.org.uk/whats-on/perfume-synaesthesia-late">https://www.somerset-house.org.uk/whats-on/perfume-synaesthesia-late</a>		
108	44	c	New York	Astor Place	74.01° W	JFK	05/08/2017	8:00 AM	Overcast, warm	Walk	NYC DOT Summer Streets	KM	12	To compare and contest smells printed on giant smellmap	Zoltar!			
109	44	d	New York	Astor Place	74.01° W	JFK	05/08/2017	10:30 AM	Overcast, warm	Walk	NYC DOT Summer Streets	KM	15	To compare and contest smells printed on giant smellmap	Free smelling as a comparison of 4 similar items is really successful			
110	44	e	New York	Astor Place	74.01° W	JFK	12/08/2017	8:00 AM	Overcast, warm	Walk	NYC DOT Summer Streets	KM	10	To compare and contest smells printed on giant smellmap	4 trash cans / 4 passers-by			
111	44	f	New York	Astor Place	74.01° W	JFK	12/08/2017	10:30 AM	Overcast, warm	Walk	NYC DOT Summer Streets	KM	15	To compare and contest smells printed on giant smellmap	4 green plants / 4 wing mirrors			
112	44	g	New York	Astor Place	74.01° W	JFK	19/08/2017	8:00 AM	Overcast, warm	Walk	NYC DOT Summer Streets	Miriam Songster	7	To compare and contest smells printed on giant smellmap	I can leave others to lead walks in my stead... and am OK doing so - thanks Miriam			
113	44	h	New York	Astor Place	74.01° W	JFK	19/08/2017	10:30 AM	Overcast, warm	Walk	NYC DOT Summer Streets	Miriam Songster	9	To compare and contest smells printed on giant smellmap	Thanks again Miriam			
114	46	d	London	Greenwich	0.13° W	LHR	22/08/2017	6.15 pm	Warm and dry	Walk	Final on the seasonal series	KM	4	Part 4 of seasonal - using smell visualiser		<a href="https://twitter.com/katemclean/status/900010215491481600">https://twitter.com/katemclean/status/900010215491481600</a>		
115	49	b	London	Somerset House Courtyard	0.13° W	LHR	01/09/2017	08:00 PM		Walk			?	Independent smellwalks as part of Synaesthesia Lates	I feel remote when I cannot attend and have no human leading. It is a commissioned project, not research. My new neighbour attended and loved it	<a href="https://www.somerset-house.org.uk/whats-on/perfume-synaesthesia-late">https://www.somerset-house.org.uk/whats-on/perfume-synaesthesia-late</a>		
116	50	a	NYC	Staten Island	74.01° W	JFK	06/10/2017	01:00 PM	26°C breezy sunny	Walk	Future of Storytelling Festival	KM	20	To be 'sensed reality' in a world of VR, AR and MR	One person dropped out early - very sad and disappointed in his own sense of smell.			
117	50	b	NYC	Staten Island	74.01° W	JFK	06/10/2017	05:00 PM	26°C breezy sunny	Walk	Future of Storytelling Festival	KM	15	To be 'sensed reality' in a world of VR, AR and MR	Enthusiasm of group as shared physical experience when walking through rooms of people isolated inside VR headsets - slightly surreal			
118	50	c	NYC	Staten Island	74.01° W	JFK	07/10/2017	11:00 AM	26°C breezy sunny	Walk	Future of Storytelling Festival	KM	17	To be 'sensed reality' in a world of VR, AR and MR	Just how alienating and lonely VR participants look when compared to a group of people sensing the world as a group - key moment and realisation as to the point of sensing the world			
119	50	d	NYC	Staten Island	74.01° W	JFK	07/10/2017	01:00 PM	28°C breezy sunny	Walk	Future of Storytelling Festival	KM	17	To be 'sensed reality' in a world of VR, AR and MR				
120	50	e	NYC	Staten Island	74.01° W	JFK	07/10/2017	11:00 AM	Drizzle, warm	Walk	Future of Storytelling Festival	KM	17	To be 'sensed reality' in a world of VR, AR and MR	For some people the smellwalk is simply a time-filler. You have a choice; either let them be or find ways to include them through designated activities. Each group needs readding			

121	50	f	NYC	Staten Island	74.01° W	JFK	07/10/2017	01:00 PM	Drizzle, warm	Walk	Future of Storytelling Festival	KM	17	To be 'sensed reality' in a world of VR, AR and MR					
122	51		Canterbury	City Centre	1.08° E	MSE	23/02/2018	3.30 pm	Cold, dry	Walk	Journalist interview Suddeutsche	KM	3	To communicate the nature of the smellwalk to a foreign journalist and my students	I have audio of the post-walk interview comparing smells of winter and summer				
123	52		London	Bloomsbury	0.13° W	LHR	15/03/2018	05:00 PM	Cool, dry	Walk	Laura Distefano - literature & ICT PhD from Sicily exploring immersive worlds and words for smell	KM	1	To assist a fellow researcher in understanding the practices of smellwalking for her own research	While this is listed as a group walk, it was a walk for a fellow-researcher. Resulted in offer of a place to stay in Sicily for free at any time.				
124	53		London	Portland Place	0.13° W	LHR	17/04/2018	1.30 pm	Warm, breezy, dry	Walk	BBC Boring Talks - podcast recording	KM	1	To add empirical detail of everyday smellscape to recorded podcast					
125	54		Canterbury	City centre and cathedral	1.08° E	MSE	03/05/2018	01:00 PM	Warm & dry	Walk	CCCU Sense of Place Walking Seminar	KM	4	Take geographers on a creative journey	Free smelling becoming interesting as one participant gathers data on 4 side roads to the High Street				
126	55		NYC	Museum Ave/Central Park	74.01° W	JFK	25/05/2018	01:00 PM	Warm, dry, sunny	Walk	Cooper Hewitt Smithsonian w/ Ellen Lupton	KM	34	Bring Senses: Design Beyond Vision exhibition to life	Smellwalk great - head set microphone was a real asset. Painting exercise needs exemplars. From painting to mapping needs a lot of work so scaffold visualisation of smell	<a href="https://twitter.com/atothealix/status/1000450755931885569">https://twitter.com/atothealix/status/1000450755931885569</a>	<a href="https://twitter.com/katemclean/status/1000487568046219266">https://twitter.com/katemclean/status/1000487568046219266</a>	<a href="https://twitter.com/katemclean/status/1000368066428096512">https://twitter.com/katemclean/status/1000368066428096512</a>	<a href="https://www.nytimes.com/2018/05/21/nyregion/new-york-today-smelling-your-way-to-work.html">https://www.nytimes.com/2018/05/21/nyregion/new-york-today-smelling-your-way-to-work.html</a>
127	56		London	White City	0.13° W	LHR	04/06/2018	12.30 pm	Warm, breezy, dry	Walk	w/ Belgian journalist and IED Y1 student	KM	2	Interview	White City - hmhhh	<a href="https://twitter.com/katemclean/status/1003613354538217473">https://twitter.com/katemclean/status/1003613354538217473</a>			
128	57	a	Paris	le Marais	2.35° E	CDG	02/07/2018	02:00 PM	Hot and humid	Walk	MAIF Social Club commission	KM	12	Procure smell data for bespoke artwork	I can do this in French too	<a href="https://www.facebook.com/MaifSocialClub/videos/circulez-kate-mclean-dans-lexpo-escales-en-vue/2117246718516813/">https://www.facebook.com/MaifSocialClub/videos/circulez-kate-mclean-dans-lexpo-escales-en-vue/2117246718516813/</a>	<a href="https://lieu.maifsocialclub.fr/programmation/circulez-mobi-lite-ou-va-t-on/escales-en-vue">https://lieu.maifsocialclub.fr/programmation/circulez-mobi-lite-ou-va-t-on/escales-en-vue</a>	<a href="https://lieu.maifsocialclub.fr/intervenants/kate-mclean">https://lieu.maifsocialclub.fr/intervenants/kate-mclean</a>	<a href="https://twitter.com/MSC_Officiel/status/1047793850125897728">https://twitter.com/MSC_Officiel/status/1047793850125897728</a>
129	57	b	Paris	le Marais	2.35° E	CDG	02/07/2018	06:00 PM	Hot and humid	Walk	MAIF Social Club commission	KM	12	Procure smell data for bespoke artwork		<a href="https://twitter.com/katemclean/status/1022224508067962880">https://twitter.com/katemclean/status/1022224508067962880</a>	<a href="https://twitter.com/katemclean/status/1014164440697200642">https://twitter.com/katemclean/status/1014164440697200642</a>		
130	57	c	Paris	le Marais	2.35° E	CDG	02/07/2018	02:00 PM	Hot and humid	Walk	MAIF Social Club commission	KM	9	Procure smell data for bespoke artwork	Reading and transcribing the smellnotes is great for my vocabulary	<a href="https://twitter.com/katemclean/status/1014052280373600256">https://twitter.com/katemclean/status/1014052280373600256</a>			
131	57	d	Paris	le Marais	2.35° E	CDG	02/07/2018	06:00 PM	Hot and humid	Walk	MAIF Social Club commission	KM	9	Procure smell data for bespoke artwork		<a href="https://twitter.com/katemclean/status/1013860760517316614">https://twitter.com/katemclean/status/1013860760517316614</a>			
132	57	e	Paris	le Marais	2.35° E	CDG	02/07/2018	11:00 AM	Hot and humid	Walk	MAIF Social Club commission	KM	13	Procure smell data for bespoke artwork	Furtive, fugitive et fugace - we have a title!				
133	57	f	Paris	le Marais	2.35° E	CDG	02/07/2018	02:00 PM	Hot and humid	Walk	MAIF Social Club commission	KM	12	Procure smell data for bespoke artwork					
134	58		London	Kings Cross	0.13° W	LHR	02/10/2018	12:00 PM	Dry	Walk	Galileo / Redaktion Film with Thomas Eckl	KM	3 plus 3 film crew	Film a smellwalk for German TV/online video	It all takes far longer than you think... filming is a process that requires 3 takes for every single scene using close-up, distant view etc.	<a href="https://www.prosieben.de/tv/galileo/videos/2018324-riech-touren-ein-stadtrundgang-mit-der-nase-clip">https://www.prosieben.de/tv/galileo/videos/2018324-riech-touren-ein-stadtrundgang-mit-der-nase-clip</a>	<a href="https://www.south-and-browse.com">south-and-browse.com</a>		
135	59		Paris	Banks fo the River Seine	2.35° E	CDG	06/10/2018	10:00 AM	Dry, warm, sunny	Walk	At the opening of MAIF Social Club exhibition "Escales en vue" - escaped for a morning	KM	0	To retrace the walk conducted by Jean-Noel Hallé and Boncerf of 1790	There are streets and islands that no longer exist as the Seine has changed its course and a meander silted up. The river banks no longer act as rubbish dumps, nor do they form landslides into the river. Great material for a future academic paper				

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