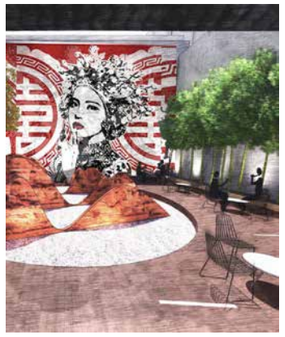
HIGHLY SENSITIVE

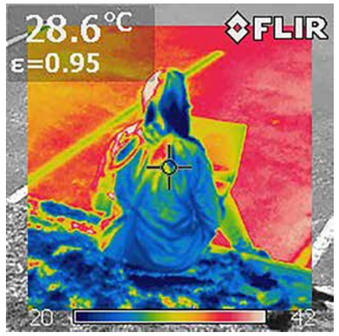
an exhibition about environmental sensors in art, design, landscape, planning, architecture and community.

CONTENTS

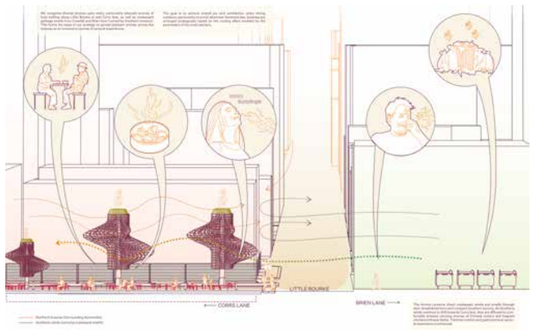
Melbourne School of Design
Faculty of Architecture, Building and Planning










INTRODUCTION

WENDY WALLS & JUDY BUSH

Environmental sensors offer us unprecedented information about the world around us. From temperature and air quality measurements to feedback from noise and touch, we can digitally capture and respond to our complex and changing environment. For the built environment professions, these forms of data and their responsiveness represent a significant step in how we think about and what we create within our environments.

Sensing technology captures local scale, fine-grained data to reveal a place's specific characteristics and workings and the interactions between different site features and designs. With sensors, we can examine how a tree impacts the temperature of the playground it is shading or how the layout of a street affects the air quality in the neighbouring outdoor eating area. When we collect and communicate this information through real-time feedback, visualisations, and simulations, our responses expand from understanding the world to becoming a powerful means of making change. Environmental sensors allow us to check our assumptions and direct our actions in ways that we may not have anticipated.

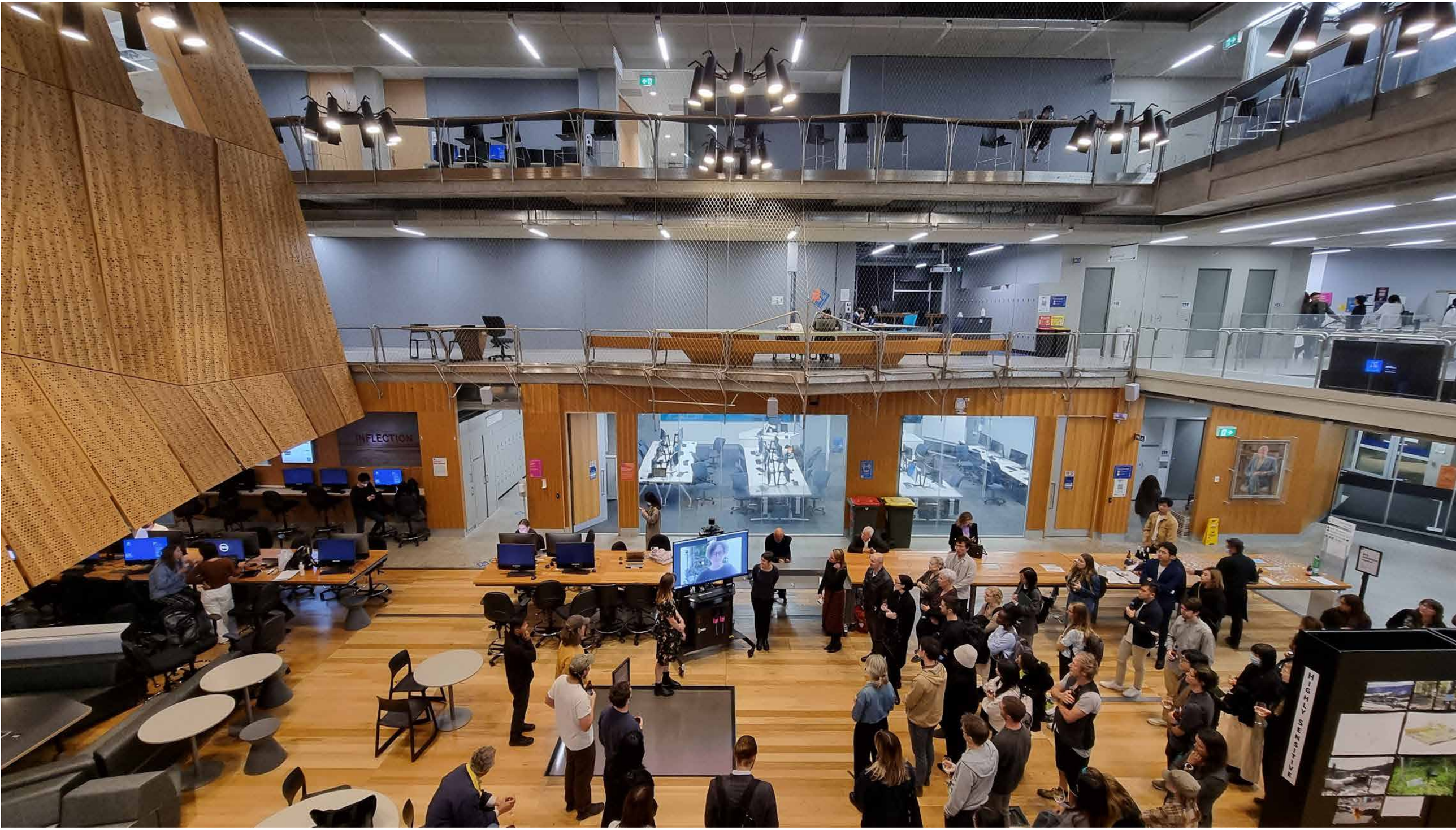
This exhibition celebrates these opportunities of environmental sensing as tools that 'keep us honest' by revealing the environment in new ways and allowing us to respond to real-time conditions.

The work is gathered from research and teaching in the Melbourne School of Design within our aligned disciplines of landscape architecture, urban planning, construction, and architecture. Consistent across the work is the aim of using environmental sensors to make a positive change to the quality and experience of the environment. The projects range from urban design based on the temperature sensor data of urban microclimates to the visualisations of light, air, and temperature. There is also work with sensors used as reactive devices, for example, the pneumatic muscle and the microclimatic misting tree.

We are very excited to include the work of our visiting Dean's lecture guest, Professor Jennifer Gabrys. She practices and writes extensively on working with sensors with community groups in contaminated environments. The work displayed here is from her forthcoming book Citizens of Worlds and shows air quality sensors used to collaborate with communities to monitor air pollution from fracking infrastructure, document traffic emissions, and create air quality gardens.

Across this range of work, we see the value of environmental sensors as instruments of curiosity and accountability.

The detail of sensed data reveals our environment and our place and influence within it. Particularly as our climate continues to change, we need to draw together the range of tools, data, and knowledge to plan and design healthy and sustainable places to live.


INFLECTION
HIGHLY SENSITIVE

Jennifer Gabrys is Chair in Media, Culture and Environment in the Department of Sociology at the University of Cambridge. She leads the Planetary Praxis research group and is Principal Investigator on Smart Forests: Transforming Environments into Social-Political Technologies. She also leads the Citizen Sense and AirKit projects.

She is the author of ***How to Do Things with Sensors*** (2019); ***Program Earth: Environmental Sensing Technology and the Making of a Computational Planet*** (2016); and ***Digital Rubbish: A Natural History of Electronics*** (2011). Her most recent book on the Citizen Sense project titled, ***Citizens of Worlds: Open-Air Toolkits for Environmental Struggle***, is forthcoming from University of Minnesota Press.

Citizens of Worlds: Open-Air Toolkits for Environmental Struggle

University of Minnesota Press, 2022

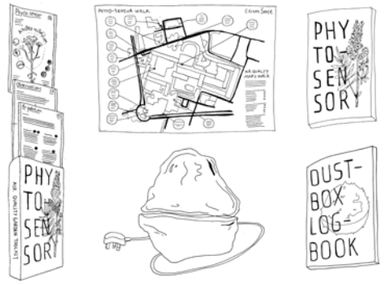
Pre-publication chapters can be viewed at:
https://manifold.umn.edu/projects/citizens-of-worlds

Environments are increasingly sites of pollution, extraction, disaster, and development. Citizens of Worlds examines how citizen-sensing technologies and practices observe, evidence, and act on environmental disturbance. By focusing especially on how people use sensors and sensing technologies to monitor air quality, this book asks who or what constitutes a "citizen" in citizen sensing. How do digital sensing technologies enable or constrain environmental citizenship?

Taking the form of a how-to guide, Citizens of Worlds documents projects from the Citizen Sense research group, which built digital sensor toolkits for documenting and analyzing air pollution. This practice-based study describes collaborations with people to monitor air pollution from fracking infrastructure, document traffic emissions, and create air quality gardens. In the process of installing sensing technologies, this study considers the aspirations, collaborations, troubleshooting, disappointments, and political change that are forged in specific sensing projects.

As these projects show, how people work with, respond to, care for, shape, fight for, and transform environments informs the political subjects and collectives that they become. Citizens and worlds materialize through attempts to sense and struggle toward more breathable conditions.

Photographs by Citizen Sense.



Photographs by Citizen Sense.

1.Fracking site Pensylvania

2.The toolkit includes a Speck particulate matter 2.5 monitor, a BTEX badge for monitoring pollutants from petrochemical industry, a Frackbox for monitoring criteria air pollutants, a data platform for analyzing citizen data, and two logbooks for collecting observations and referring to monitoring instructions.Illustration of the toolkit components by Sarah Garcin.

3. Citizen Sense Kit developed for monitoring air quality in relation to fracking infrastructure, northeastern Pennsylvania. Illustration of a Frackbox installation by Kelly Finan.

4.A citizen monitoring gas emissions near fracking infrastructure

5.pro-fracking signs at vacated home site noted to have polluted well water in Dimock, Pennsylvania.

6. Frackbox installations through the winter at compressor station.

7. Frackbox installations through the summer at compressor station.

8.Logbook with monitoring instructions and space for recording observations

9.Dustbox kit of parts Illustration by Sarah Garcin.

10. Dustboxes, a particulate-matter sensor for monitoring air quality developed by Citizen Sense.

11. Dustbox monitor and installation at participant location in New Cross Gate.

12. Documenting species during an air-quality garden walking tour.

13. Dustbox installation near the Old Tidemill Garden in Deptford; community-planning guidelines for establishing a neighborhood plan.

14. Protest installation at the demolition of Old Tidemill Garden and nearby trees along Deptford Church Street and the Thames Tideway super sewer.

15. Phyto-Sensor Toolkit workshop, participants developing proposals for air-quality gardens to be included in the toolkit.

16. .Air-quality plants, including Euphorbia and Lamb's Ears.

17. Phyto-Sensor Kit of Parts. Illustration by Sarah Garcin

18. The final version of the toolkit was made available through the Museum of London and Citizen Sense websites.

19. Phyto-Sensor Toolkit developed by Citizen Sense for developing air quality gardens and monitoring air quality.

20. Air-quality garden walking tour visits the pop-up garden developed through the City in Bloom initiative.

21. Participant of air-quality garden walking tour documenting air-quality plants.

THE HEART

ROBERT WALTON AND
ZAHER JOUKHADAR

Can a building have a heart? Does a building feel and can it dream?

Imagine if the life of Melbourne Connect (MC) as a building and a community could be revealed through the collection and visualisation of computational data. We are creating a major permanent digital artwork called 'The Heart' for the foyer of MC that visualises what the building is 'feeling' through its thousands of live data gathering sensors. The Heart will beat for the duration of the building's life - at least 42 years until the end of the current lease. Its pulse is extrapolated from the sensations of its body: the 'smartest' building in Parkville. The project is well underway and is being developed through the collaboration of a broad coalition of university researchers, professional staff from FFAM and MSE, students, leading external craftspeople, and the MC architects and builders. The artwork reveals building functions that are normally hidden 'offstage' to bring to mind the volume of data and work supporting the life and optimal functioning of the University community. The pulse of MC is derived from Building Management System data combined with electricity generation (solar and geothermal), external temperature and wind direction, zoned data and power usage, human movement and behaviour.

COLLABORATORS;

PAUL LIM, THE HEART ARRAY LEAD, ADDITIVE; BOSCO SHAW, THE HEART NODE LEAD , ADDITIVE; ZAHER JOUKHADAR, AI/ML & DATA LEAD, MELBOURNE DATA ANALYTICS PLATFORM; GENDRY MORALES, CREATIVE TECH CONSULTANT; BRAD HAMMOND, DIGITAL TWIN/UNITY LEAD; LINDSAY BICK, LOI TAN, LUKE SUTTON, MATT DRIVER PROJECT MANAGERS; ALEKS MICHALEWICZ, DATA STEWARDSHIP, MELBOURNE DATA ANALYTICS PLATFORM ; JOINTLY, BUILDER; CALLAN MORGAN, FABRICATION DESIGN; JEREMIAH ROSE, HEART RATE SENSOR DESIGN; DR RACKEL SAN NICOLAS, CONCRETE EXPERT; DR CHARLES SEVIGNY, HEART ANATOMY EXPERT; MARK CHANDLER, MASTER GLASSBLOWER; KARL GORDON, MASTER NEON ARTIST ; AIDAN MCLOUGHNEY AND BOBBIE SHABAN, MELBOURNE DATA ANALYTICS PLATFORM; UNIVERSITY MASTER STUDENTS: IBHAV SHRIDHAR, NITIKA MALHOTRA, RONAK ARVINDKUMAR VACHHANI, CHARU SMITA SINGH, UTKARSH SINHA, XINYU LI, YIZHOU ZHU, SAHARSHA KARKI, LEI LUO, PEIYANG LI ; ORIGINAL PITCH TEAM: ROBERT WALTON, ZAHER JOUKHADAR, EDUARDO VELLOSO, HENRIETTA LYONS; CONSULTANTS: JUSTIN GREEN,KATIE SFETKEDIS, BRAD QUIRK (DATA SCIENTIST), ALAISTAIR FLYNN (SENIOR ASSOICATE, WOODSBAGGOT), HAZEL PORTER (PRINCIPAL, WOODSBAGGOT), ALASTAIR COSSART (SENIOR STRUCTURAL ENGINEER, ARUP)

THE LAST OF THEIR KIND

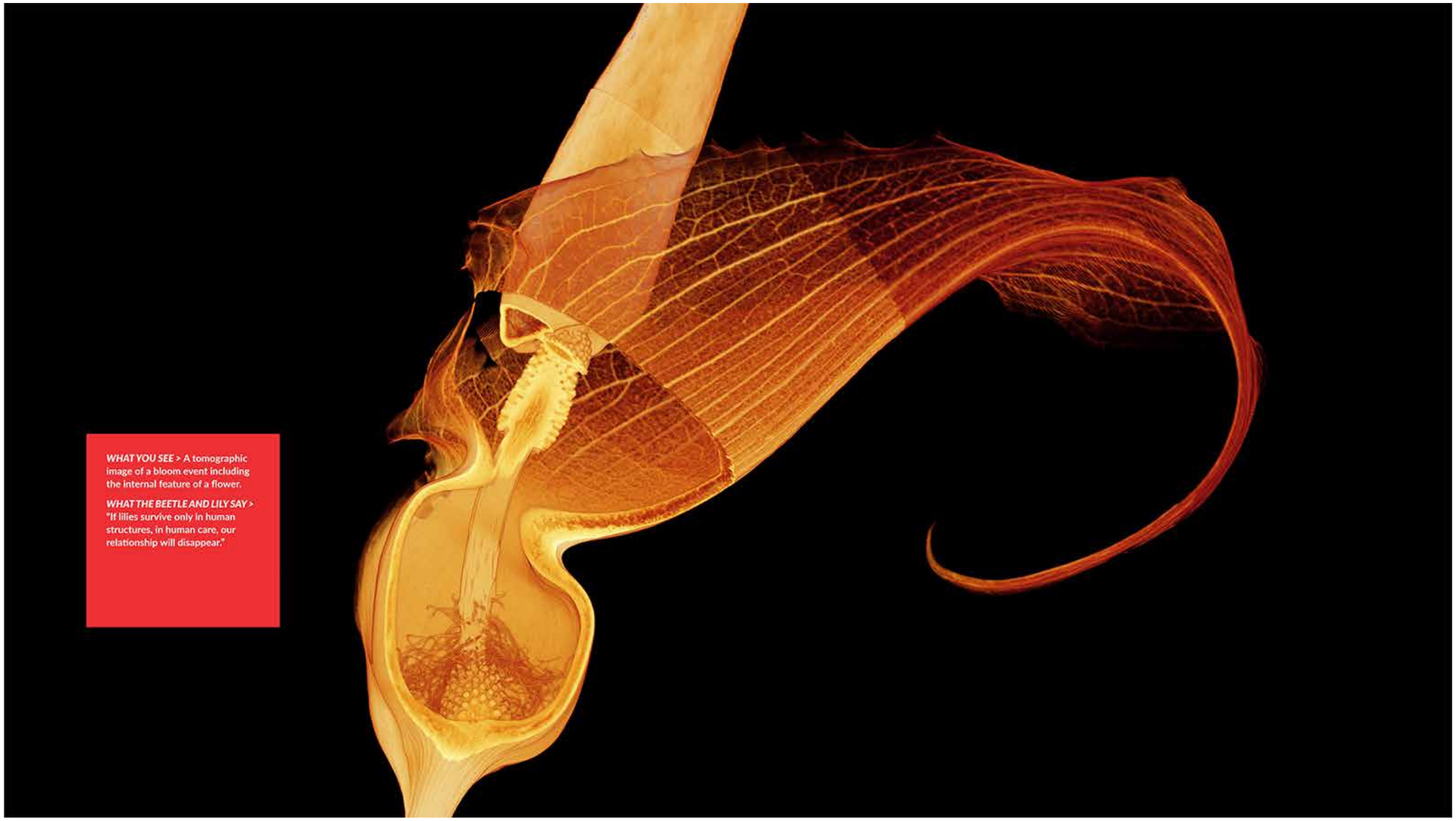
ALEXANDER HOLLAND, JULIAN RUTTEN, STANISLAV ROUDAVSKI

The Last of Their Kind is an outcome of a research program that seeks to open possibilities for participatory designing that involves nonhuman lifeforms. This exhibit gives detail to rich stories of interspecies communities. To provide a brighter contrast with familiar human-centred narratives we focus on plant lives. Humans often study plants as resources. Instead, we seek to tell stories about self-directed lives of plants and raise relevant ethical questions. The Last of Their Kind focuses on individuals, species and communities facing extinction. Some call these beings 'endlings'. How should humans study and preserve stories of beings that go away, often forever?

Engaging with these beings, we use lasers, magnetic fields, and particle accelerators to generate detailed data representations of plant worlds.

Applying analytical tools and artificial intelligence to this data, we seek to capture the richness and nuance of behaviours, capabilities and preferences that characterise nonhuman lives.

These stories attempt to create a narrative world that can support multiple perspectives, including nonhuman. We believe such spaces are a foundation for fairer and more hopeful interspecies futures.



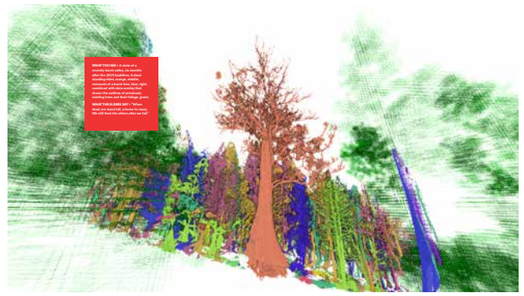
The Last Elders

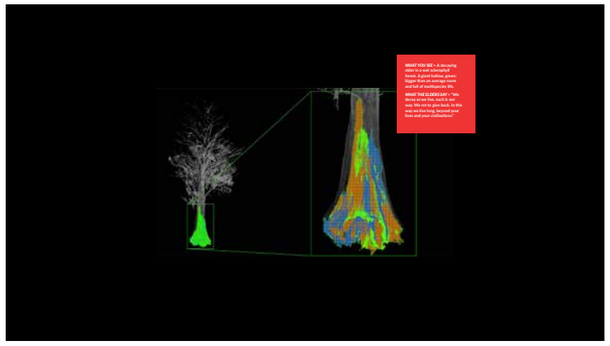
Old mountain ash tree (Eucalyptus regnans)
200 left, with twelve of the largest twenty burnt in 2019

This story is about a disappearing stage of life, and death.

Eucalyptus regnans *trees live in Australia's southern forests. Among frequent bushfires, they have evolved to die and grow quickly. In wet Tasmania the fires are rare. There, cool valleys are home to elders that live for hundreds of years. They are among the largest organisms on Earth. However, the climate is warming, and the forests are drying. The giants burn, fall, and die. Humans are not likely to ever see such trees again. The forest community will have no elders.*

Large old trees are homes to many beings and hold many stories. We show topographies that create wet conditions, stands of giant trees, individual living and dead trees and their neighbours, bark, moss, lichen, epiphytes and animals that live within them. To trace this story, we use computational analysis and artificial intelligence to probe the data acquired by laser imaging and synchrotron radiation.





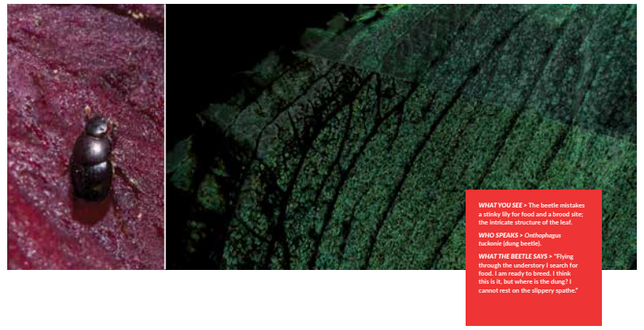
The Last Blooms

Stinky lily (Typhonium species affinis brownii)
Less than 100 left in the wild

This story is about a disappearing behaviour and its participants.

The lily takes twenty-four hours to open its petals. It heats its central organ and releases odours that mimic dung to attract a beetle. After twelve hours, the petals close, trapping the guest for an overnight stay. The beetle brushes against the lily's pollen and is free in the morning. The flower dies; other lilies await their turns.

Mostly living in labs, this plant blooms only one day per year. Our story follows its mating ritual with thermal cameras, three-dimensional surface scanning and microscopic tomography that can look inside of objects. We use multiple scans from many devices to create and animate composite images.



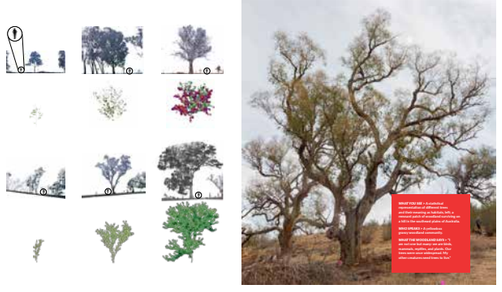
The Last Places

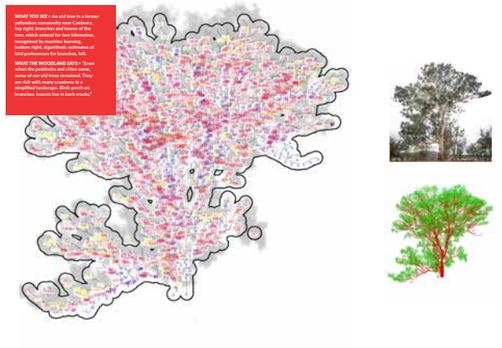
Yellowbox (Eucalyptus melliodora) *grassy woodlands*
97% lost since the European Colonisation

This story is about a disappearing form of landscape and its interlinked communities.

Close to many cities and unnoticed by most humans live the last remnants of a once mighty community. These communities of yellowbox trees, grasses and many other beings last thousands of years. Birds nest in dead branches of older trees and feed on the insects in rotting bark. Lizards and insects hide in the grass or in the folds of the trunks. Recent human land use destroys saplings and as the older trees die, the community dwindles.

Our story follows a group of small, medium, and large trees. Using data analysis and artificial intelligence we recognise leaves, branches, and other vital features in complex tree structures. Combining these capabilities with observations of bird behaviour we consider relationships between trees and arboreal life, in support of better understanding of their roles and significance.





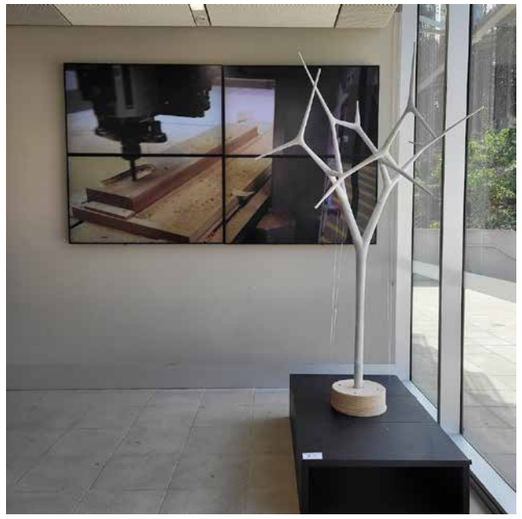
MIST HOLDER

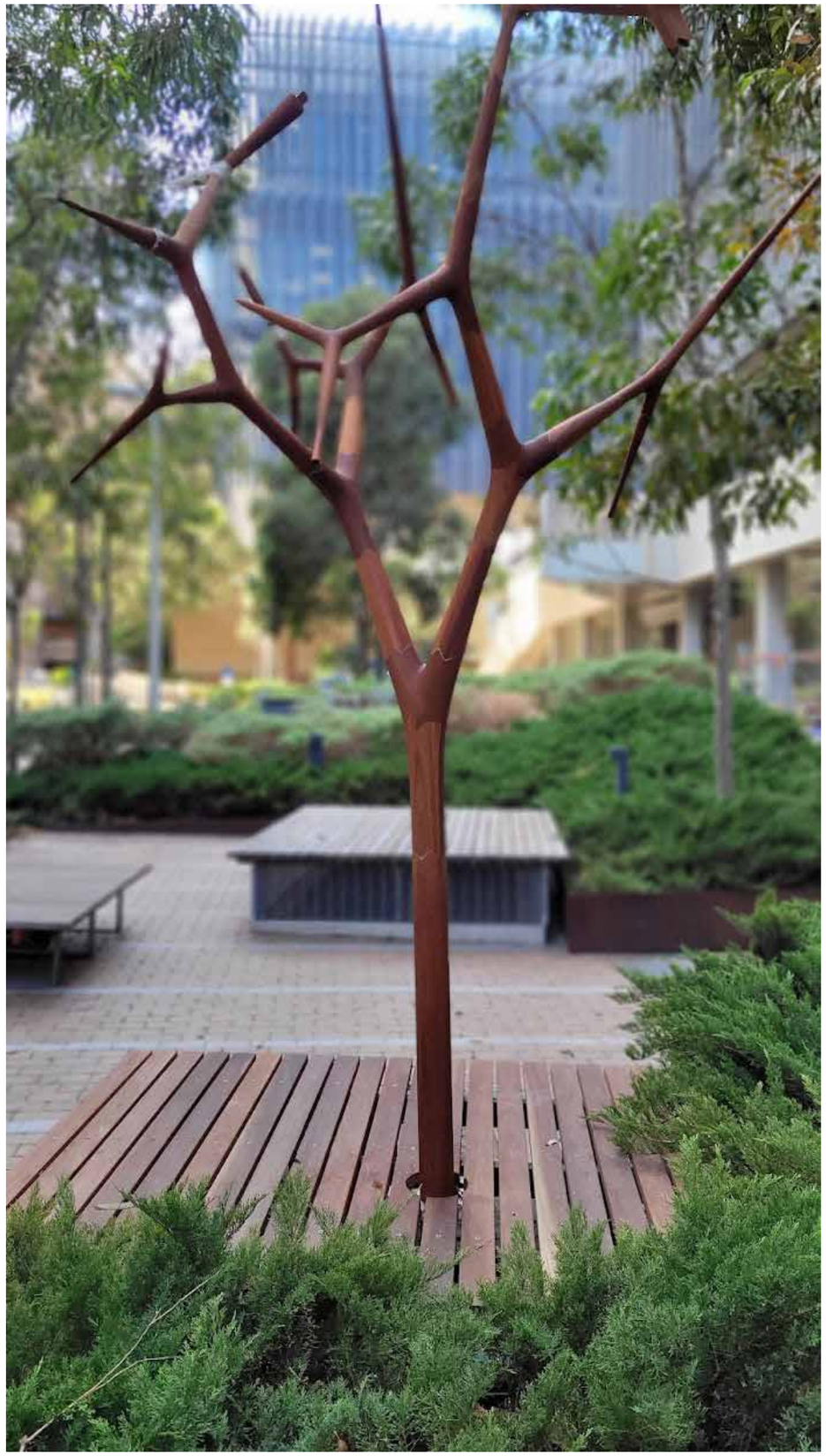
DJORDJE STOJANOVIC, MILICA VUJOVIC,
MILAN KATIC, YI DING

Advanced Digital Design and Fabrication Research Hub at the Melbourne School of Design, in collaboration with OZmist, an industry partner and misting systems manufacturer, presents the Mist Holder, an affordance designed for mist cooling and microclimate control. The design comprises a mechatronic system, a mist cooling system, and a holding structure.

The mechatronic system includes sensors capturing local climatic conditions and occupancy count, a microcontroller, and valves with servo motors regulating the emission of water spray nozzles to optimise misting system's performance.

The misting system converts water into water spray to cool the air and consist of the water pump, supply lines and nozzles. The presented tree-like structure is designed to hold the misting system.
A full-scale working prototype of a holding structure, reaching the height of 4 meters, composed of 56 parts milled with a 4-axis machine from native Australian hardwood, is manufactured within the Digital Fabrication Laboratory, a design and research-based fabrication course as part of the Digital Design and Fabrication Electives at the Melbourne School of Design. The prototype is installed at the outdoor seating area next to the North Entrance to Melbourne School of Design, Parkville Campus and exhibited as part of Melbourne Design Week 2022.





INTELLIGENT LIGHTING NETWORKS

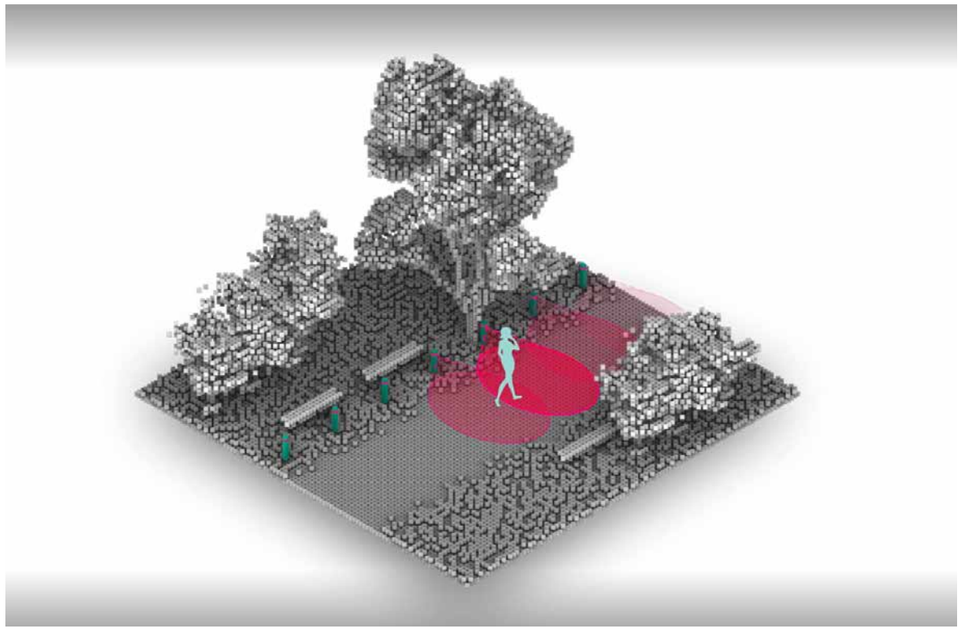
TONY YU, STANISLAV ROUDAVSKI

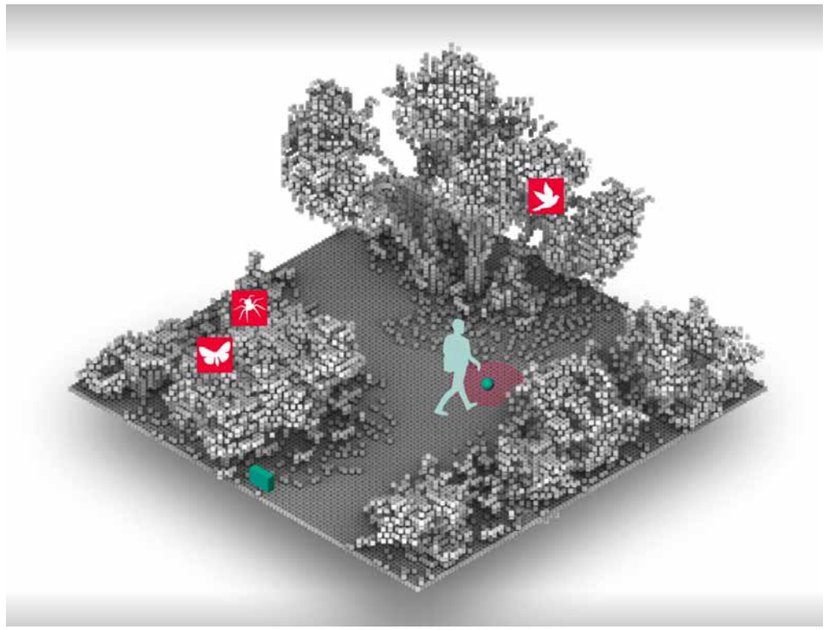
This project addresses detrimental effects of the environmental light pollution by developing intelligent lighting networks that support nonhuman as well as human needs. Artificial sources of light at night are increasing by 6% every year. Existing design trends do not acknowledge the needs of nonhumans or provide systems that can flexibly adapt to their behaviours. Computational analysis, simulation and interactive visualisation provide opportunities to reassess such approaches. We use these tools to ask how design can address the damaging misalignment of nonhuman needs and human preferences for light.

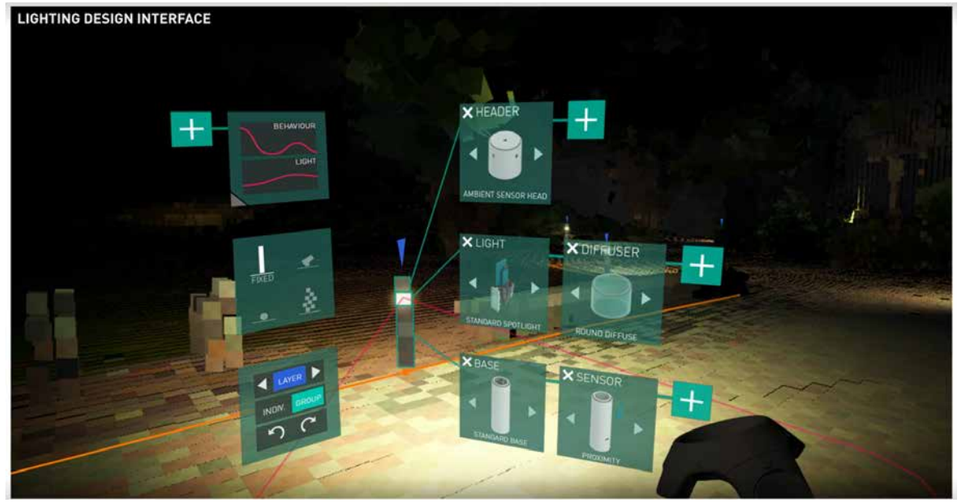
Our results demonstrate that data-driven simulations, immersive interactive visualisations, and persistent multi-modal input systems can extend design imagination.

In contrast to non-responsive and anthropocentric lighting systems, the proposed intelligent lighting network uses smart luminaires and mobile-device controls to adapt to the uncertain dynamics of urban ecosystems.

This research contributes to knowledge about urban ecologies and develops novel options for urban rewilding. It does so by highlighting the damaging effects on light and proposing an innovative approach to lighting design. This approach broadens the scope of possible implementations, demonstrating their plausibility, and formulating concrete research questions about ecological, social, aesthetic, economic and risk-related aspects of interspecies lighting-design.







NOISE MAPPING IN AN URBAN ENVIRONMENT: COMPARING GIS-BASED SPATIAL MODELLING AND PARAMETRIC APPROACHES

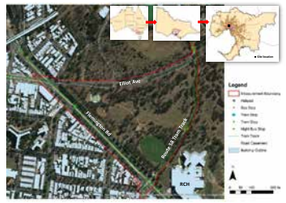
SIQING CHEN, ZHIZHEN WANG

Noise nuisance has been a major environmental complaint in urban residential areas as it impacts many areas with high population density and affects the inhabitants in their daily life. Noise mapping is one of the best ways of understanding environmental noise. In the present study, we conduct noise mapping for an inner-suburb precinct adjacent to Melbourne CBD using GIS geostatistical interpolation and parametric (Rhino + Grasshopper) approaches, based on traffic noise data collected using field measurement. We then compare the spatial and temporal patterns of noise dynamics based on measured noise data and modelled noise level outputs.

Preliminary findings shed light on understanding traffic flows and noise level, noise attenuation through landform and tree planting and urban design.

We discuss the effectiveness and compatibility of the two modelling approaches, and potential applications of the outcomes of this study in informing landscape planning and design to mitigate noise pollution in the urban environment.

The study area

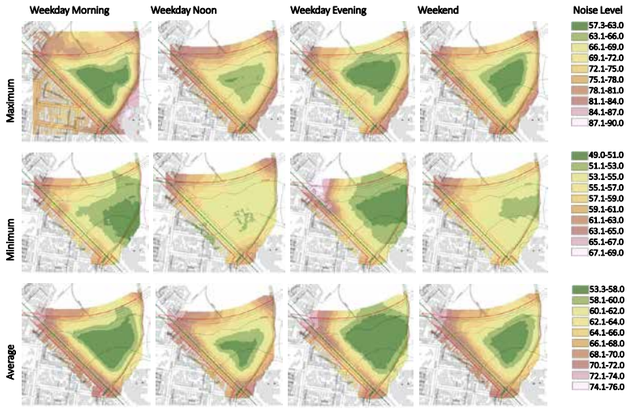


Flemington Road traffic is a major noise source

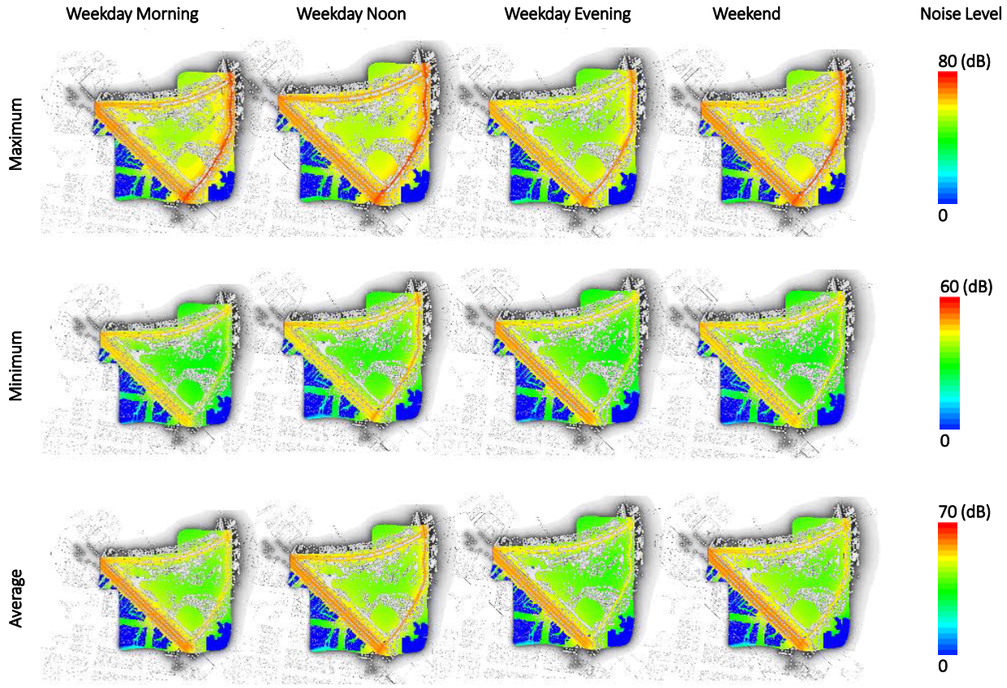
In-situ noise measuring points

Locations of trees and tree groves (noise attenuation)

Urban noise mapping in a GIS environment

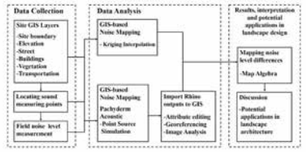


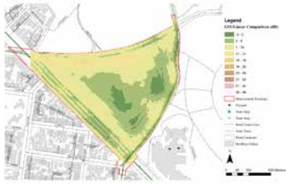
Urban noise modelling in a parametric environment



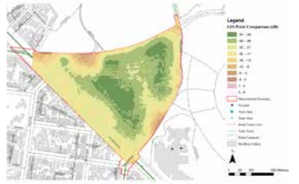
Comparing noise mapping in GIS and parametric environments

Methodological workflow in GIS and Rhino



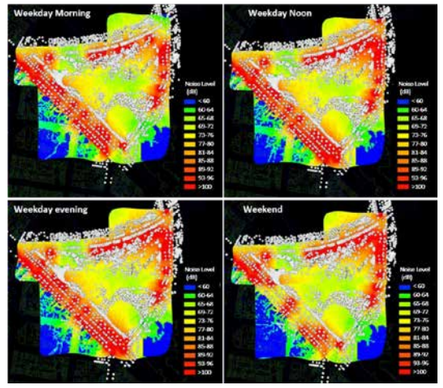


Noise mapping in GIS and linear noise simulation in Rhino

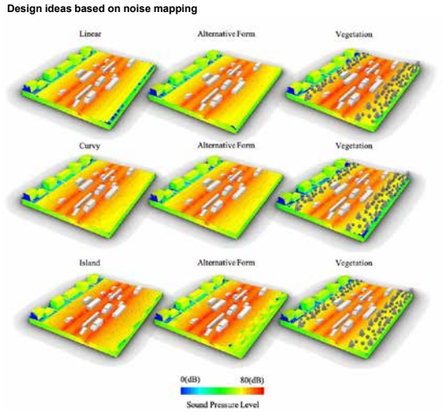


Noise mapping in GIS mapping and point noise simulation in Rhino

Rhino-based point source noise mapping



Design ideas based on noise mapping

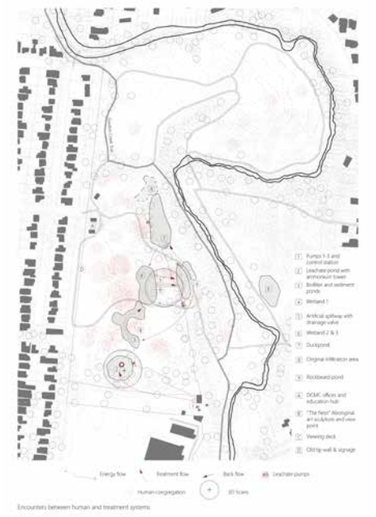


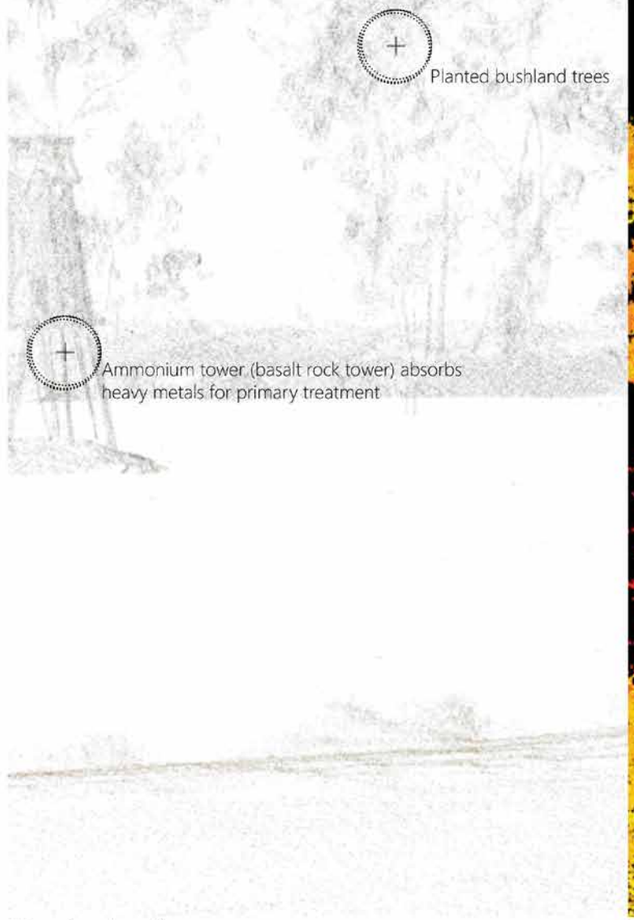
DAREBIN BIOREMEDIATION PARKLANDS

ALEX FELSON AND ANNA MUELLER

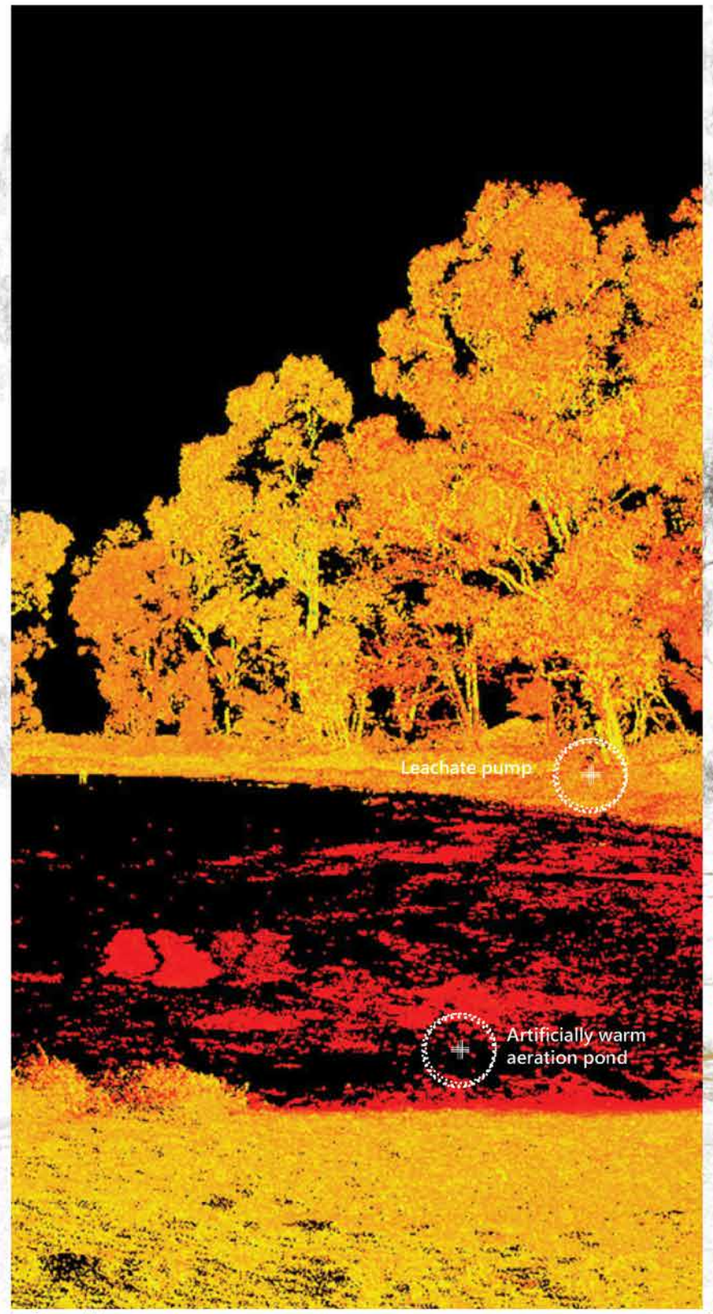
This project targets the Darebin Parklands, a bushland park 7 km from Melbourne's CBD with a chequered past. Originally a quarry, the area was then used as a tipping hole intensively from 1965-1975, which included contaminated trash. Through conservation efforts in the 1970s the land was converted into parkland. Unbeknownst to the group involved in forming the park, water from an existing underground aquifer was flowing through the trash and flowing straight into the Darebin Creek. The EPA stepped in in the 1970s and a system was constructed to capture and pump water from the old tip site into an above ground bio-engineered remediation system. The water treatment ponds serve simultaneously as a public park with duck ponds and pedestrian pathways circumnavigating the ponds. We utilised 3D scanning of selected park areas to highlight the difference between park and treatment chain and to capture the interaction of visitors and publics spaces with this treatment system at a human scale. We used thermal imaging and dense point clouds to pick up on hidden details.

This work aims to capture the post-industrial, infrastructural and remnant ecological conditions that exist within the parklands, often unnoticed, or unknown, by its visitors.

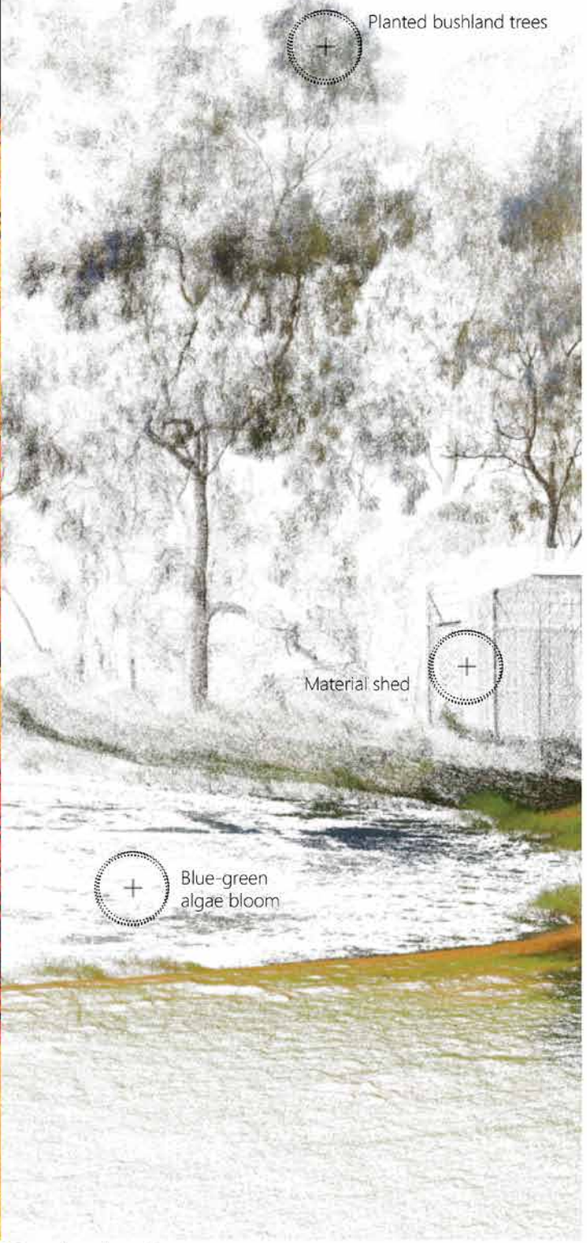




3D point cloud image



Infrared heat scan



3D point cloud image

ANTHROPOMORPHIC MACHINE

ARTIST: STELARC

DESIGN TEAM: PAUL LOH (MSD) WITH DAVID LEGGETT, YUHAN HOU, HAOYU CHEN (LLDS) + QUISHI ZHOU (FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY)

STRUCTURE ENGINEER: SASCHA BOHNENBERGER AND MATTHEW TAM (BOLLINGER GROHMANN)

SPONSOR PARTNERSHIP: FESTO

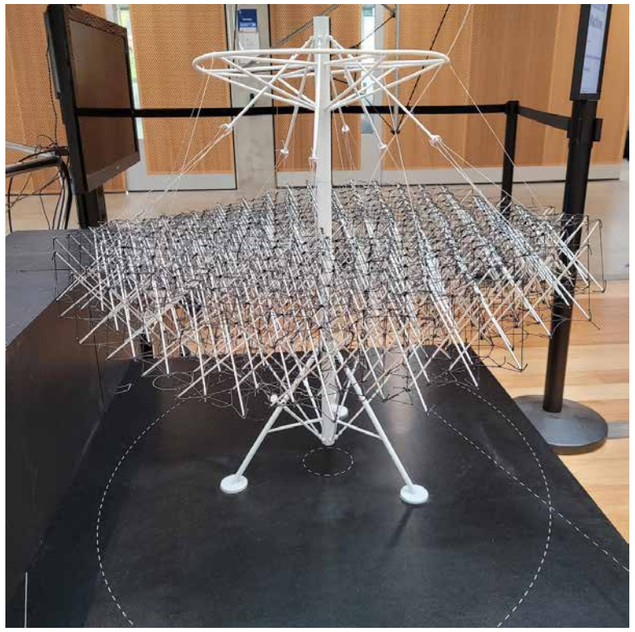
1:10 scale model with 3d printed parts, aluminium and elastic cord.

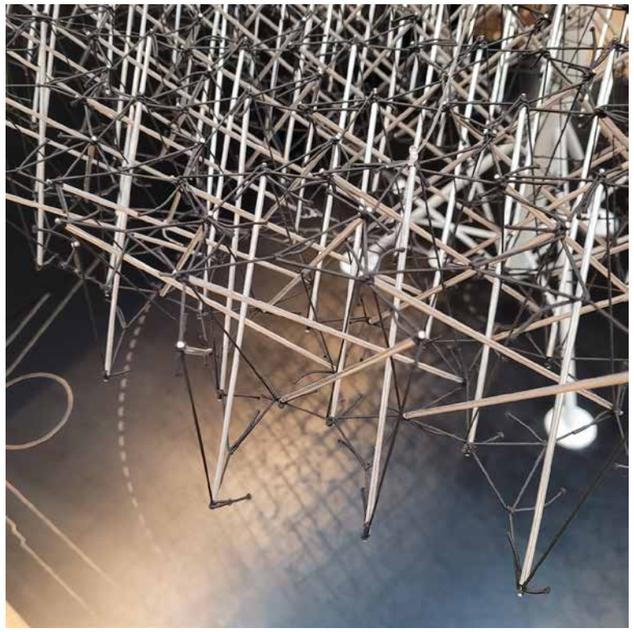
The Anthropomorphic Machine is a performative installation for the forthcoming Swarm exhibition at the Science Gallery Melbourne. While it has organs-like parts, neuron-like circuits and tendon-like muscles, its organization is synthetic, allowing the emergence of form through an open system of collective behaviours.

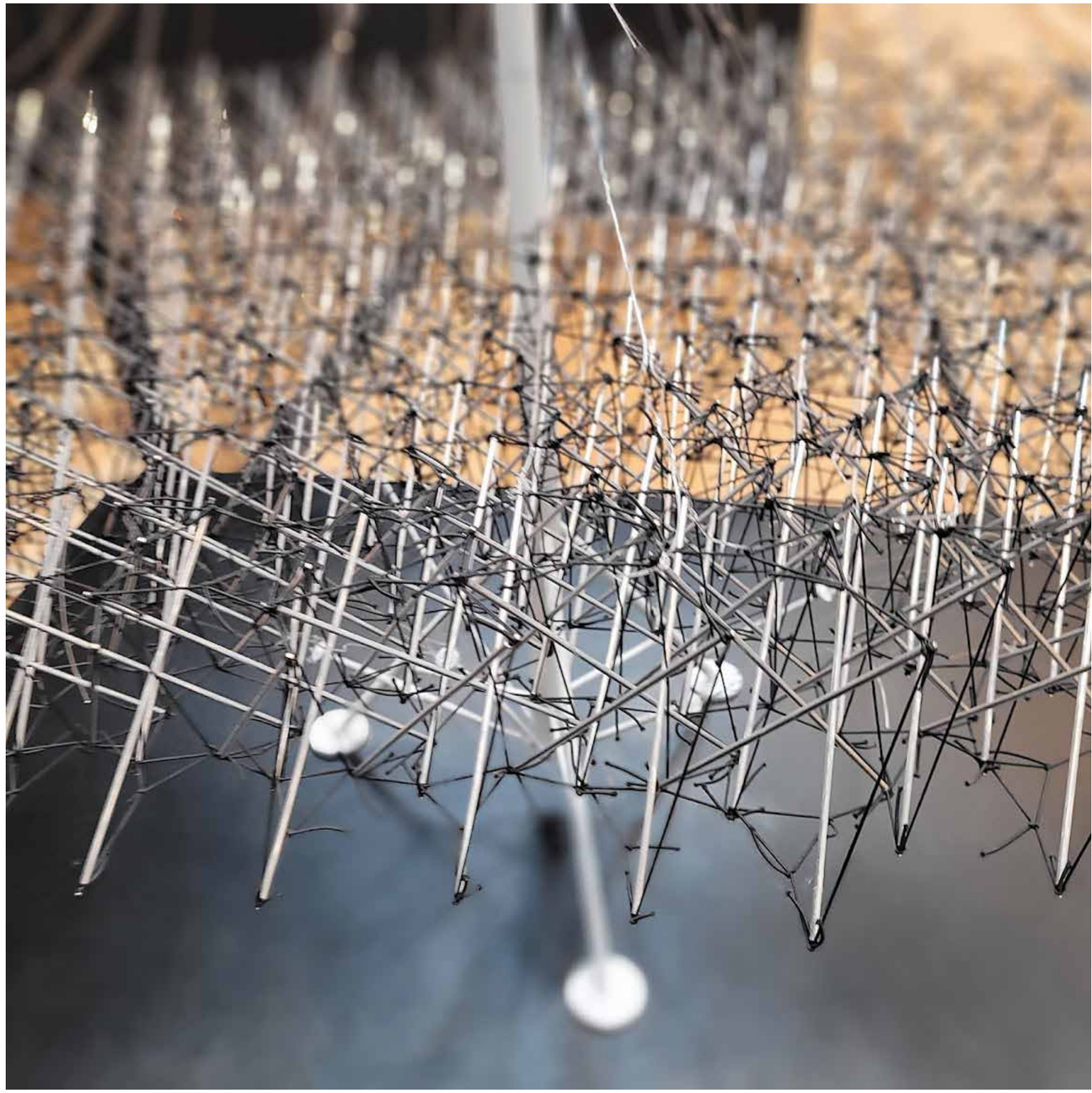
Operated remotely via web-based and physical human interactions, the machines with 12 pneumatic muscles and computer visions articulate a cloud of tensegrity structure to create emerging effects.

It is anthropomorphic in so far that it has human-like behaviour, programmed through human-machine interaction.
This project builds on Stelarc's fascination with the body and the potential to disassociate its function as a Hegelian entity as a holistic, complete system. In collaboration with LLDS, the project explore an organism as an organization of parts that has the potential to self-regulate in a state of digital-biosis* through robotic visioning and pneumatic (air). The project questions the nature of the human body and what it means for architecture to be a self-regulated system – a body without organs.

*Digital-biosis. Noun, life in the presence of digital data. This new word was invented to describe this project.







ANTHROPOMORPHIC MACHINE

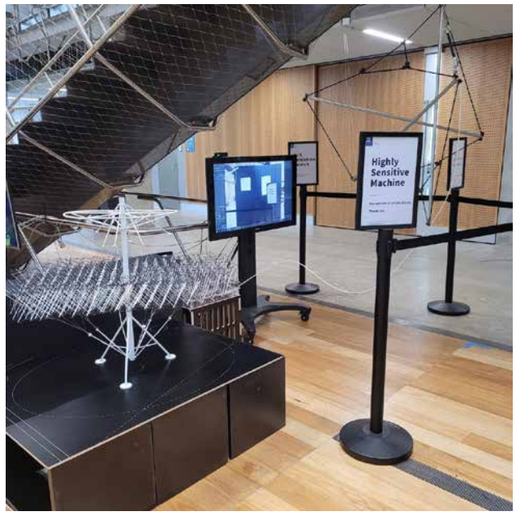
TUTORS: PAUL LOH (MSD) WITH DAVID LEGGETT (LLDS), YUHAN HOU, AND STELARC

VISIONING: QUISHI ZHOU (FACULTY OF ENGINEERING AND INFORMATION TECHNOLOGY)

PARTICIPATING STUDENTS: MASON MO, YING LEE, LU BAI, SHENG YICHEN AND SHI MINGJIA

1 to 1 prototype with steel tubes, Festo Pneumatic muscle and elastic cord.

This prototype developed during the 2021 Architectural Association Visiting School (AAVS Melbourne) involved a group of Master and Undergraduate students in building fragments of the Anthropomorphic Machine and testing its degree of movement with Festo pneumatic muscle linked to open-source visioning software. An Arduino microcontroller controls the pneumatic muscle.



DESIGNING FOR HEAT IN THE PUBLIC DOMAIN

WENDY WALLS

TUTORS: RAVI BESSABAVA & FIONA JOHNSON

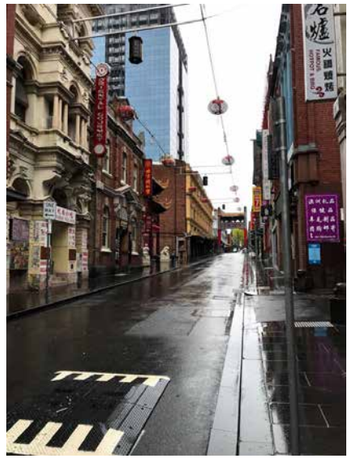
Following the extensive COVID-19 lockdowns, the city of Melbourne has begun re-opening and activating the inner CBD. One of the key proposals has been transforming streets, footpaths, and lanes into space for outdoor dining. However, creating outdoor space for all seasons is no small task - highly variable weather events are a hallmark of Melbourne's local climate. Added to this challenge are longer-term changing climate patterns where projections range from extreme heat waves to rising humidity levels. This interdisciplinary design studio explored the creation of microclimates and atmosphere in designing post-COVID-19 streets and lanes in the China Town Precinct of Melbourne's inner city.

For these projects, environmental temperature sensors captured local temperature, wind flow and humidity patterns. This fine grain of data provided insight into the site's distinctive atmospheric and environmental behaviours.

By engaging with these dynamic and fluctuating conditions, the design responses explored qualities of retreat, refuge, pleasure, and comfort as drivers of urban design.

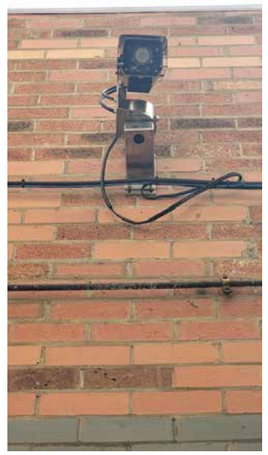
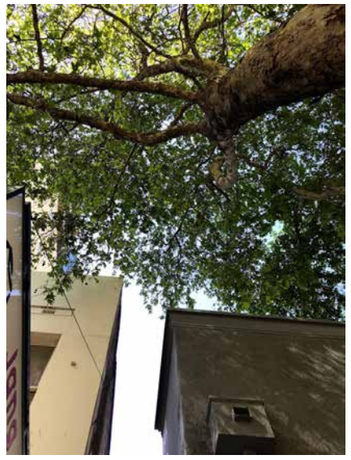
Further, the methods engage with the city through its temporal conditions, from morning to night-time, summer to winter – celebrating the climate for moments of contrast and delight.

Thanks to all the students who have taken Designing for Heat over the years, and especially the projects featured here.







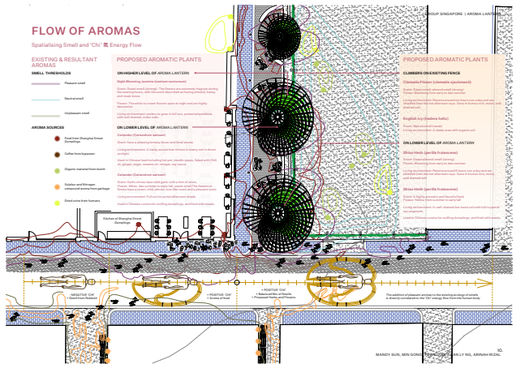


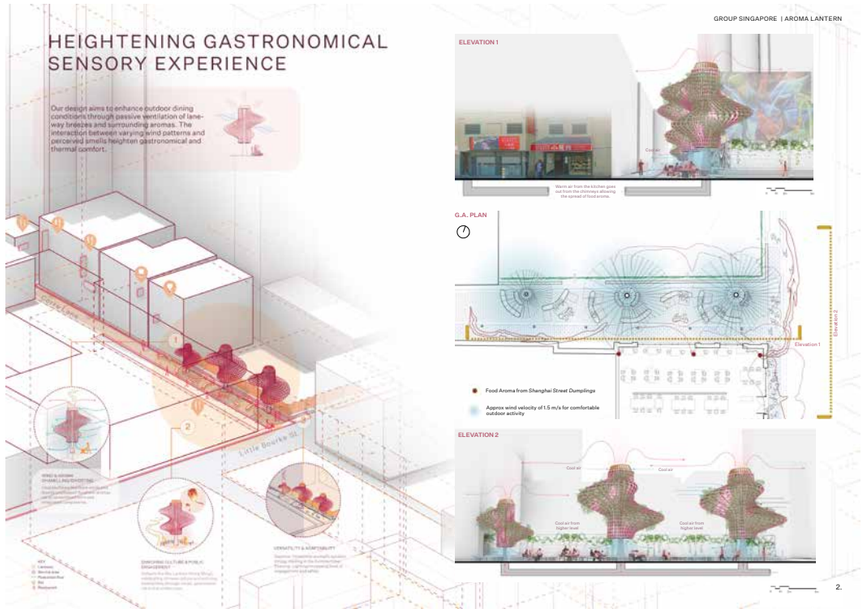

AROMA LANTERN

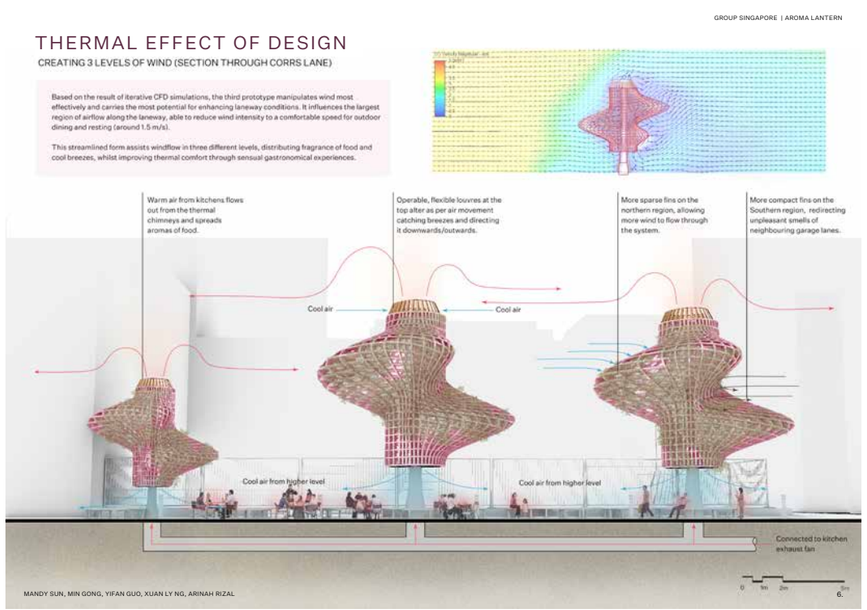
ARINAH RIZAL, MANDY SUN, YIFAN GUO, XUAN NG, MIN GONG

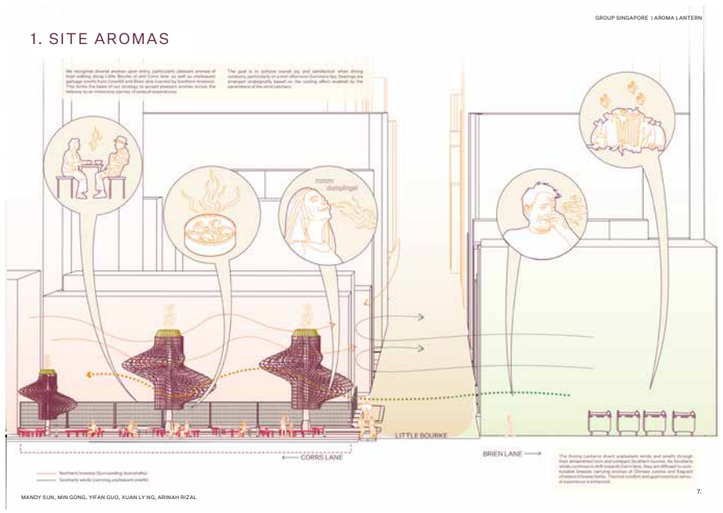
The design aims to enhance outdoor dining conditions through passive ventilation of laneway breezes. By working with the interactions between varying wind patterns and surrounding aromas the experience of the urban environment can become a thermal and gastronomical delight.

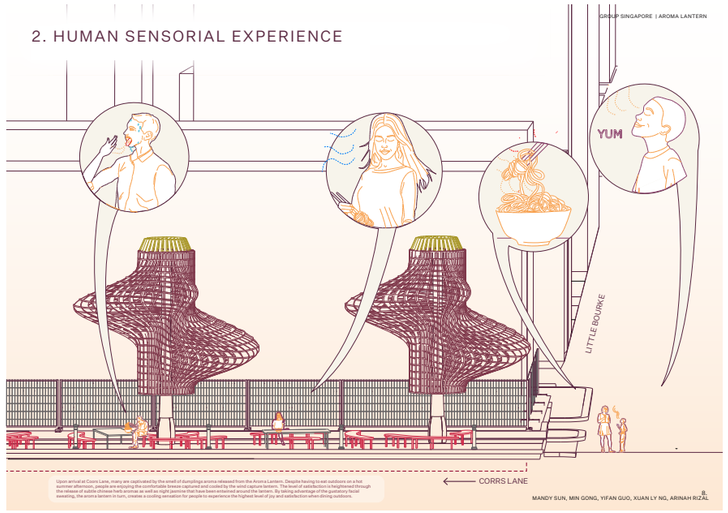
The aroma lanterns can create the perfect place to eat a spice bowl of noodles on a hot summer night.

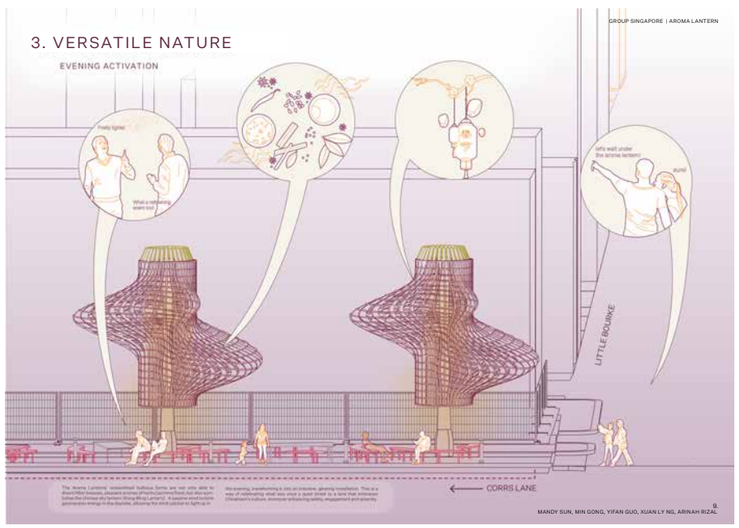








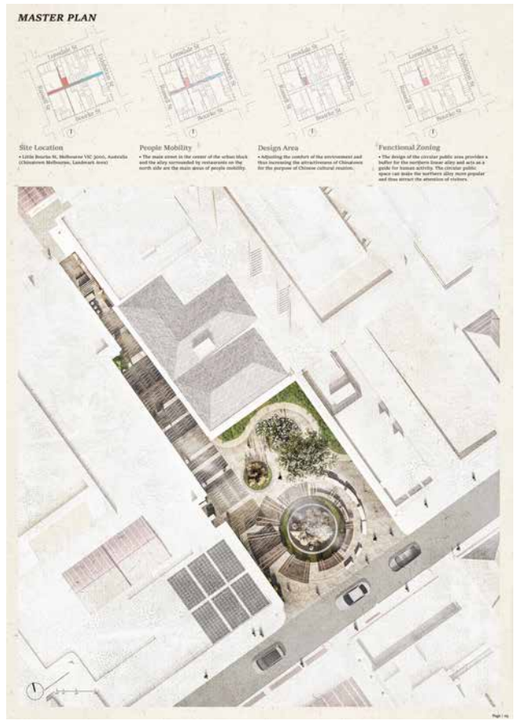


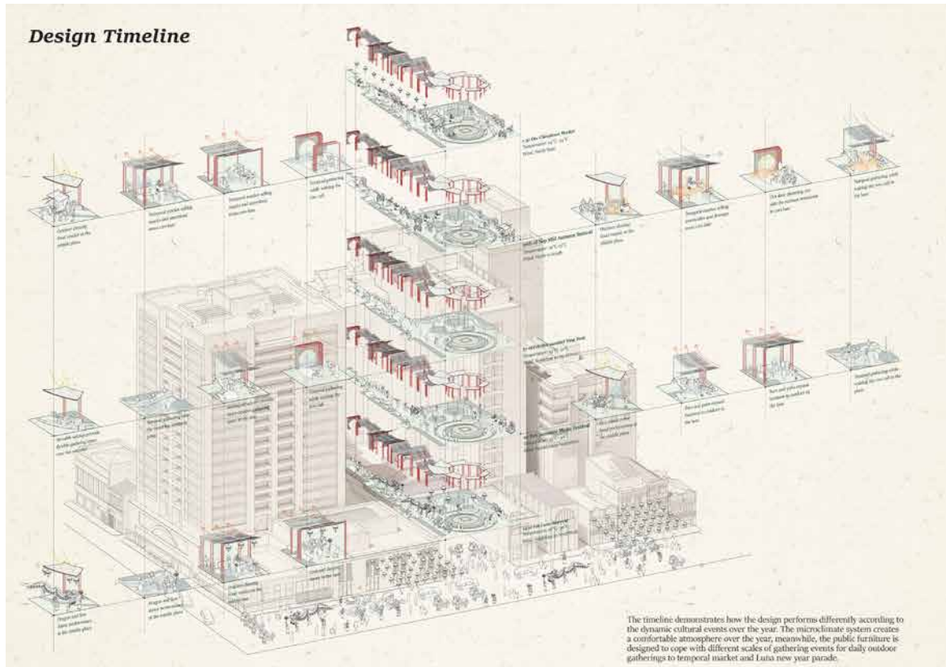


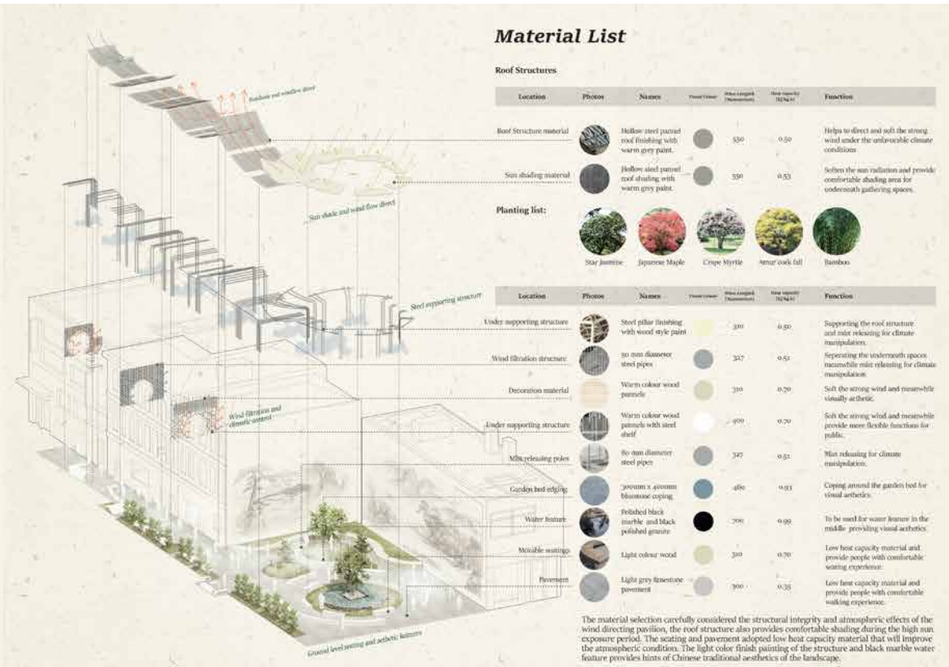
SENSORY ALLEY

DONGYAO ZHANG, MINGXUAN ZE,
HAOYI LI, HAOYANG WANG, JIEZE TAN

Inspired by the traditional Chinese architecture - Fujian Tulou - the design of the Tulou is deconstructed to incorporate temperature control and distinctive culture into the landscape design. Considering that the reason for the formation of Chinatown originated from the gold rush in the 19th century, more and more Chinese people gathered in the area to form a distinctive cultural neighbourhood. Our design vision is to amplify culture in Chinatown, increase people's comfort in the area and create a thriving Melbourne character precinct. And to utilize atmospheric comfort theory as the tool to tackle the issues and spatial opportunities at the forefront of climate change and decrease the negative influence of extreme climate even. In the design vision, the environment, temperature, and physical comfort of the site are redefined, with small, delicate regulating devices with vegetation, implicitly expressing cultural expectations within the city of Melbourne, allowing all who pass by to feel the unique charm of the neighbourhood.



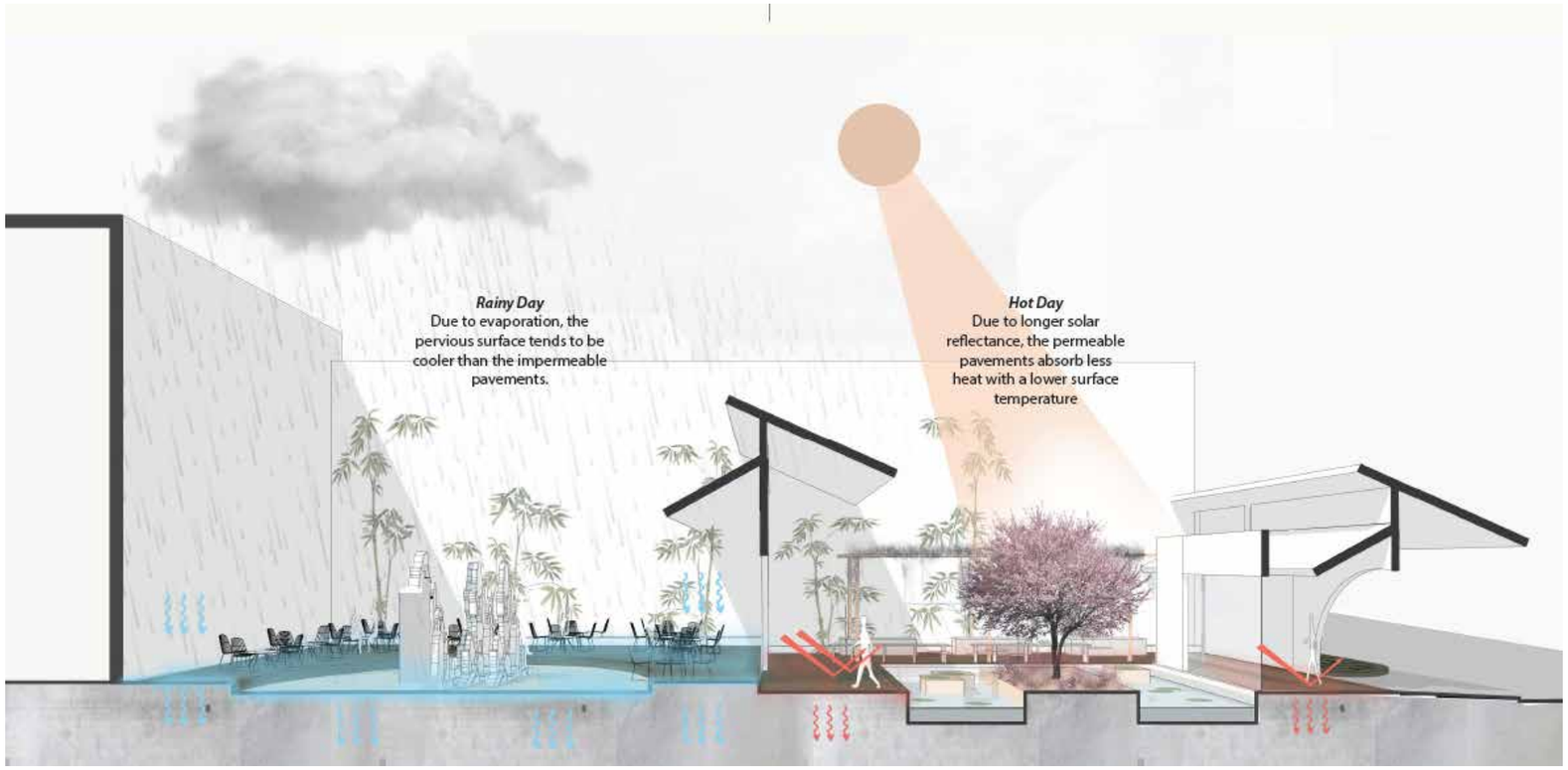




CULTURAL MICROCLIMATE PARK

HUI YUAN KOH, ZHIYONG PE,
LIYING TAN, HONGYU WEI,
MINJIE LIANG

The urban park is designed by strategically combining the design principles of a Chinese garden with microclimatic design strategies. By working with the changing atmospheric sensations through the seasonal moments of major Chinese cultural events including the Chinese New Year and Mooncake festival, the park becomes a comfortable space where people can enjoy the outdoors all year long. It is located on Little Bourke Street, in the middle of the oldest Chinatown in Australia - hence the park plays a role in conserving Asian cultural heritage. This is a place where visitors can enjoy comfortable outdoor space and experience Chinese culture.



UNFOLDING SEASONS

ANDREW KURNIWAN, JUNYI LIXU,
KESTER CHEONG, LEO VINCENT,
ZHEHAO WANG

In Ancient China scholar gardens are spiritual retreats from the stresses of the world. In the context of Melbourne, the project aims to create a scholar garden with a multi-seasonal experience as one strolls through the site. The project refers to the Chinese Garden 'Geyuan' which created multiple seasons on site through planting types, visual cues & abstracted metaphors. By merging these influences & adding an additional layer of the microclimate, 'The Unfolding Seasons' express the ephemeral beauties of Chinese culture through the featuring of the season & the subsequent, this creates microclimatic options for visitors & gestures them to revisit Chinatown in the next season.

THE UNFOLDING SEASONS

CHINATOWN, MELBOURNE

PROJECT DESCRIPTION

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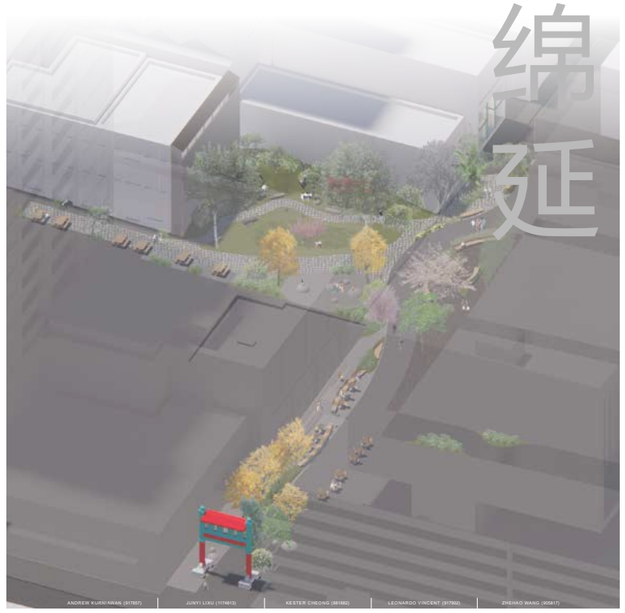
项目介绍

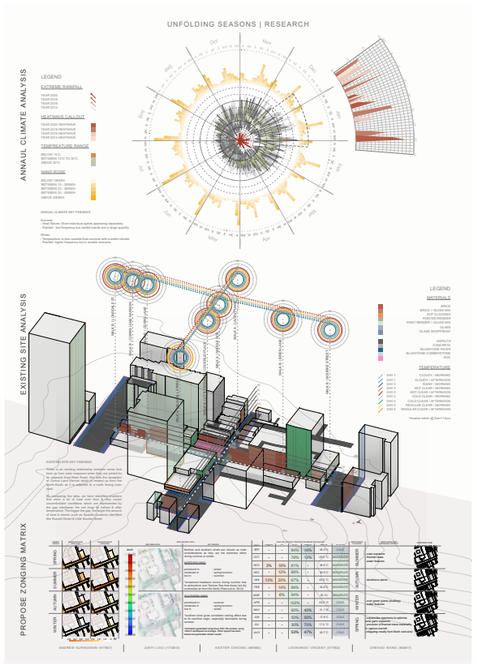
中国古典文人园林的兴盛起源于文人对现实世界的巨大压力的不满和精神上的逃避。而在墨尔本的中国城，我们的项目也想打造一个拥有着多重季节体验的，游人可以漫步于其中的“文人园林”。

本设计参考了著名的中国园林“个园”，它通过造物造型、五感刺激和抽象比喻，将四季融于一园，巧夺天工。我们在此基础上通过小气候的营造增强了温度体验，其主题“四季绵延”展现了季节交替的流动感（场地中包含两个季节，即当季和用小气候打造的下一季节），突出了好似昙花一现的季相景观。这种微缩季节为游人提供了每日一新的体验，并促使其再次光临

四季绵延



UNFOLDING SEASONS | RESEARCH



UNFOLDING SEASONS | WINTER

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WINTER

The 'SPRING IN WINTER' area is zoned due to its most optimum solar gain during winter season. To optimise, thermal mass strategies are applied both to the ground material and the furnitures. Plants are also strategically placed to mitigate mostly Northen winter wind, while adjacent deciduous trees will allow solar exposure in winter.

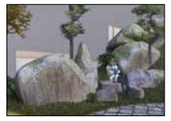
A OPENNESS
The area is designed as a small open square. Deciduous trees would allow solar exposure during winter and block excessive heat during summer.

B THERMAL BACKREST
The adaptable seat can be closed during winter, thus exposing the concrete base as its back rest, functioning as thermall mass directly to the body.

C GROUND MATERIAL
The main ground material for this microclimate area is Percydale cobblestone, the darkest from the material palette to perform best as thermal mass.

UNFOLDING SEASONS | AUTUMN

LIGHT WALL A
The wind catcher can be lit up utilising the semi-transparent polycarbonate material, creating point of interest in the evening.



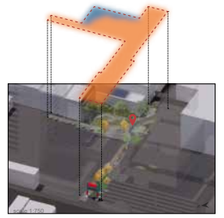
ROCKS AS FILTER B
Varying size of rocks are strategically placed in front of the wind catcher bottom openings to break wind speed into more comfortable gentle breezes.

BIOSWALE C
The centre open space also acts as a bioswale to collect excess water during rainy season, stored underground and used to subsidise plants watering.

秋

AUTUMN

The 'WINTER IN AUTUMN' area is zoned due to its shaded condition all year around. To enhance the microclimate experience a wind catcher is built to catch cool Southern wind. This gesture will create slightly colder atmosphere during autumn to mimick winter feel, while creating cool comfortable condition during summer.



UNFOLDING SEASONS | SUMMER

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SUMMER

The 'AUTUMN IN SUMMER' area is zoned according to the most shaded areas achieved during summer. Moreover, manipulating wind is crucial to create autumn microclimate in summer season, by allowing cooler Southern breeze while minimizing occasional hotter Northen wind. This is done by strategic plantings to form wind breaks.

A SHADED
The area is naturally the most shaded area during summer due to its immediate proximity to a tall building on its North, thus giving cooler atmosphere.

B CATCHING BREEZE
The adaptable seat can be opened during summer, blocking the concrete base as its back rest and become porous, allowing breeze to go through due to its from.

C NORTHEN WIND BREAK
Based on the Northen wind simulation and analysis, wind break in this corner is crucial to mitigate occasional Northen hot wind during summer.

UNFOLDING SEASONS | SPRING

EAST-END WIND BREAK A
Since this area is the East end of the whole site, a wind break is implemented using mounds and plantings to mitigate from excessive Eastern wind.

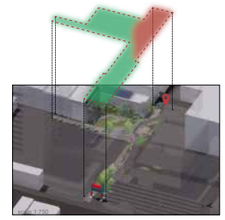
The 'SUMMER IN SPRING' area is zoned due to its most optimum solar gain during spring season. Moderate thermal mass material is applied to enhance solar absorption without excessively heating the space. Low-medium shrubs are introduced the reduce wind from the East end of the site without over shading the area.

春

SPRING

ROAD WORK B
The road work subtly demarcates car lane and new pedestrianised garden area with slight level change and material changes on the East end of the site.

GROUND MATERIAL C
The main ground material for this microclimate area is Harcourt cobblestone, the second darkest from the material palette to perform as moderate thermal mass.



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