[ij]

idea journal

interior technicity: unplugged and/or switched on

vol. 17, no. 01

2020

the journal of IDEA: the interior design + interior architecture educators' association

the one and the multiple

Müge Belek Fialho Teixeira
Queensland University of Technology
0000-0003-0593-9597

Frederico Fialho Teixeira
University of Queensland
0000-0003-2853-2343

abstract

This article presents the design research process of *The One and the Multiple*, an artwork designed in response to Frank and Eunice Corley's photographic collection of Brisbane's suburbia. It departs from the construction of image as a transitional element, built in our minds through empirical experience. Similar to photographer Frank Corley's work process, in order to represent space, one has to be present. Understanding Corley's photographic collection as an ontological database oriented by the question of the one versus the multiple, the artwork exposes the decision that affects the work on two distinct levels: effects arising from the specific manner in which Corley privileges the multiple over the one, and affects arising from the very fact that the collection starts with opportunities in multiplicity.[01]

The creation and appropriation of *The One and the Multiple* is not based on the image itself, but rather on its empirical connection to people. Through the use of drone-captured photogrammetry and point-clouds, data is translated into a multimodal spatial experience, which abstracts how and why one may become influenced by a photograph through a digital deconstruction of the image and its subsequent materialisation. Nonetheless, as one is constantly immersed in space, our mental space is constantly producing new paths or connections, either consciously or subconsciously through the technicity of the artwork. Folding inward, *The One and the Multiple* reveals photography as a visual dialectic that is altered in the immersive and multimodal use of virtual reality. As a form of enquiry, *The One and the Multiple* reveals a philosophy that is always dynamic, exposing relations between concepts and categories of the Corley Collection.

cite as:
Belek Fialho Teixeira, Müge and Frederico Fialho Teixeira.. 'The One and the Multiple,' *idea journal* 17, no. 01 (2020): 221–236, http://doi.org/10.37113/ij.v17i01.357.

keywords:
suburbia, home, virtual reality, urban interiority, photogrammetry

introduction

This article presents the design research process of *The One and the Multiple*, an artwork created for the State Library of Queensland (SLQ) exhibition entitled *Home: A Suburban Obsession*.[02] *The One and the Multiple* is a multimodal artwork, composed of a physical sculpture and a virtual environment, and exhibited from 7 December 2018–14 July 2019 in SLQ's temporary exhibition gallery (Figure 01). Funded by SLQ, *The One and the Multiple* built on the research of the authors, in the context of 'urban interiors' and 'multimodal art.' Having backgrounds and teaching experience in architecture and interiors, the authors have been using technology with the emphasis on transvergent design methodologies and techniques to create bespoke artworks and spatial experiences for 21st century art and design.

In this context, *The One and the Multiple* synthesised and represented a new way of engaging with suburbia by combining physical and immersive experiences.

Figure 01:
Cagil Yurdakul, Exhibition of the sculpture and its VR experience, 2019.

The physical component, embodied by an angled wireframe sculpture, formed a constrained space in which the user was invited to experience the immersive component of the virtual environment. This tectonic form also represented evidence of an architectural element, in particular a corner house in suburban Brisbane. By 3D scanning the corner house, its morphology was recreated through algorithmic design to inform the wireframe sculpture. It became an abstract gateway, which invited users to extend their experience of suburban interiors through using a virtual reality (VR) tool. This mode of representing suburbia was extended using raw spatial data, both visual and aural, in the virtual environment.

Using technologies like 3D Scanning, drones, VR Headsets, and gaming platforms, *The One and the Multiple* employed design methodologies such as granular sound synthesis, computational design, and digital fabrication to create the sculpture and virtual environment. This article discusses the underlying concepts and technical aspects of the design of *The One and the Multiple*, and the authors' creative response to suburban obsession, the construction of the image and the technicity of the artwork.

suburban obsession

Home: A Suburban Obsession was based on a donated and archived photographic collection at SLQ, containing more than 60,000 photographs of homes taken by Frank and Eunice Corley. The Corley collection spanned twenty years and captured the variety and richness of Brisbane's suburban life (Figure 02).

In a process that included driving a pink Cadillac through the streets of Brisbane, Frank Corley captured more than 300,000 photos of homes between the 1960s and 1970s. The uncertainty to which Corley gave evidence in the employment of any photographic terms such as focal length or long exposure, and his informal method of taking photographs while driving, often rendered the photos incoherent, comparable to today's Google Street View in an analogue way. In fact, they were not intended to expose architectural or photographic notions, they were purely rhetorical images that offered a business opportunity. Photographs appeared as a transient glimpse of what street life is like, with residents coming and going, getting caught peeking out of windows, or mowing the lawns. After indexing this journey on wheels, Frank would deliver his camera rolls along with the index cards of his routes to his wife Eunice for processing and cataloguing in a parked caravan; they were later to be sold to residents as proud artefacts of their homes. These artefacts ranged from calendars, thermometers, and postcards with house photos, ready to be sent to relatives overseas or proudly hung to showcase to visitors. Corley's images detached themselves from any photographic process through the repeated and almost automated act of representation.

After a decade of explorations for an ideal disposition of the collection, SLQ decided to create an exhibition by collaborating with academics, artists, and designers to showcase the richness of Brisbane's suburbia. The exhibition had three different approaches to the collection. The first approach researched by academics consisted of Corley's actual photos of homes alongside stories and artefacts that belonged to important Brisbane personalities. The second approach contained creative artworks such as paintings, sculptures, and VR environments in response to Corley's collection by designers

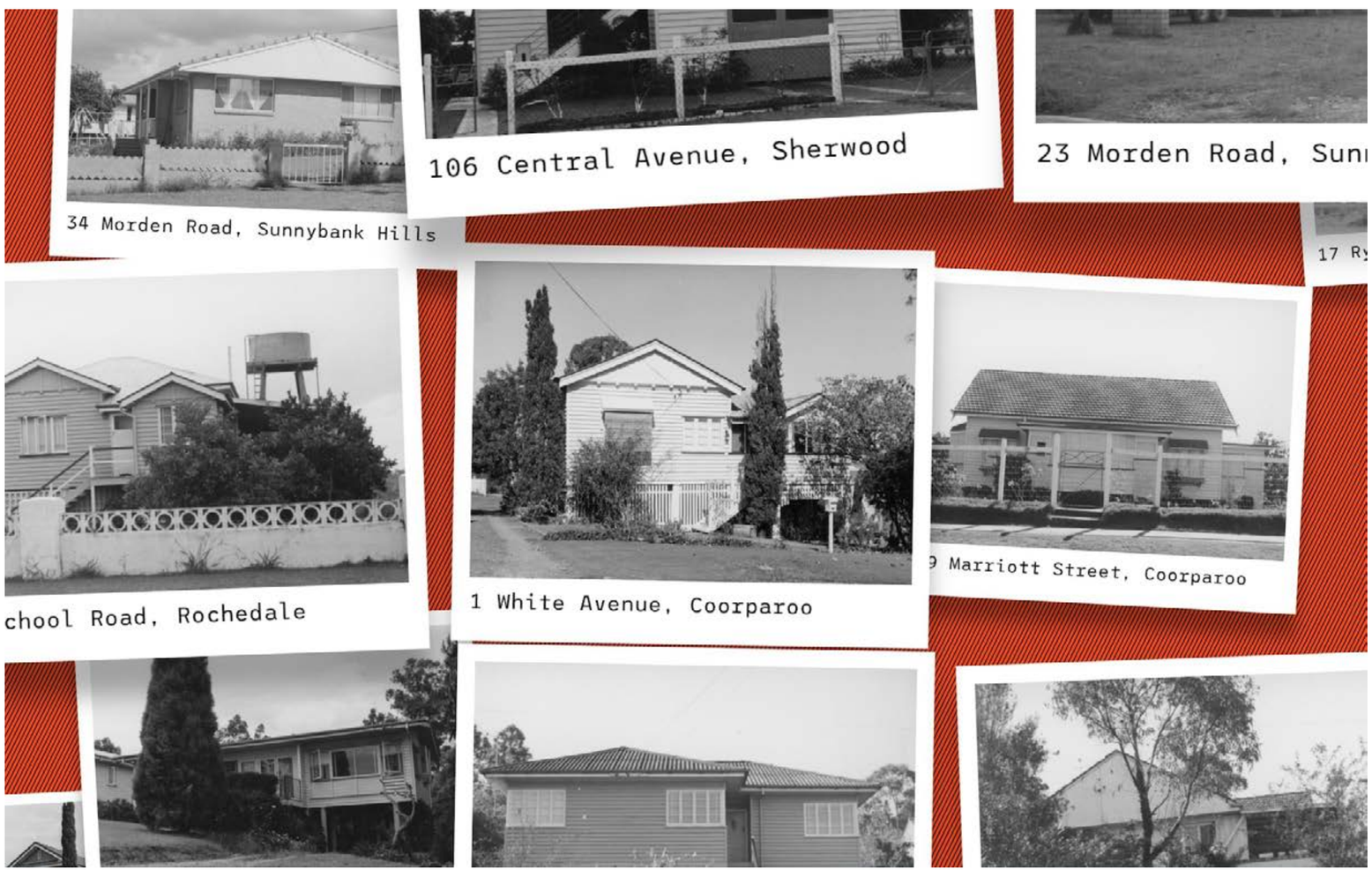

Figure 02:
Frederico Fialho, Corley's Photographic Collection, 2019.

and artists. The third approach requested the audience to observe and contribute to their role as Brisbane residents by crowdsourcing the untold stories of photographed houses through a web-based digital repository.[03] This approach managed to appropriate and connect Brisbane suburban histories to individual narratives, revealing a collective recollection, anxious to unite individual lives through photography and memories. The exhibition presented the city from the viewpoint of its residents, creating an understanding of Brisbane's urban interior as collective individuation.[04]

The exhibition stated that the main purpose was to explore the social and emotional connections to suburban homes and their urban settings, by drawing attention to the unique value of each individual house. According to the exhibition curators: '*Home: A Suburban Obsession* exposes the social and emotional power of house and home, and the myriad connections between where we live and who we are.'[05]

The exhibition's objective was the construction of a suburban image, departing from the depiction of a single house into a narrative of multiple homes. The association of multiple photos showed that Corley acquired substantial understanding in what constitutes a symbolic message or connoted image of suburbia. Corley's work rendered the image as a message deprived of a code. An image that exposed clear social and emotional connections between suburbia and its multiple houses.

construction of image

The construction of image could be appropriated from a personal stance as the homeowner or from an ontological perspective, where one photo was substantiated by its collection and the relations between concepts and categories within an urban area or domain. This understanding was achieved through the efficacy, functionality, and technology of Corley's work process. In this manner, the artwork *The One and the Multiple* understood Corley's collection as an ontological database oriented by the question of the one versus the multiple. The artwork was named after Corley's obsession with a focus on capturing the 'one' house that consequently showcased the 'multipleness' of Brisbane suburbia. It exposed the effects of Corley's work on two distinct levels. Firstly, the privileging of the multiple images over one, and secondly, the very fact that their compilation emerged from a collective construction of image.

Conceivably, this constituted an attempt to employ a simple model for *The One and the Multiple* to fix the persistent multiplicity of its pictorial significance. Admittedly, this could only be achieved after being exposed to the narrative evidence offered by the collection. As philosopher Henri Bergson states, images are related to two kinds of multiplicity: that of material objects, to which the conception of number is immediately applicable; and the multiplicity of states of consciousness, which cannot be regarded as numerical without the help of some symbolic representation, in which a necessary element is space.[06]

Like many other spaces, urban spaces can inform our memories; the difference lies in how one constructs those narratives based on one's perception. Suburbia provides different percepts and affects, which oppose the over-coded, over-designed spaces of the city. According to philosophers Gilles Deleuze and Felix Guattari,

> The work of art is a bloc of sensations; a compound of percepts and affects. Percepts are no longer perceptions; they are independent of a state of those who experience them. Affects are no longer feelings or affections; they go beyond the strength of those who undergo them.[07]

Suburbia as a work of art exists independently of those who experience them. As a result, the urban interior condition that defines suburbia has its own interiority. Sociologist Richard Sennett defines interiority as a notion of subjectivity.[08] He suggests, in the context of urban interiority, it is a condition where a person simultaneously has a divided perception of experiences and behaviours. This allows a person to experience space in a state of what Sennett calls daydreaming. However, in the context of suburbia, the exterior is interwoven with the interior, where the street is an extension of interior; hence there is no room for daydreaming. When we walk outside in suburbia, we know people, we recognise the formal and atmospheric qualities of space as defining characters of urban interiority.[09] Suburban Brisbane represented in Corley's collection offers glimpses of a recent modernist past through a mnemonic encounter between space and body. The repetitive rhythm of homes, placed side by side, inhabiting a slower pace of life, defines a kind of suburban interiority, as its unique soundscape distinguishes itself with tropical birds.

Beyond this experience, suburbia potentially offers new spatial and processing opportunities. *The One and the Multiple* discovered these opportunities, where technology had a direct relation to how technicity extends, augments, and mediates memory within Brisbane's suburbia. Learning from Corley's collection, *The One and the Multiple* sees the creation and appropriation of photography as not based on the image itself, but on its empirical connections based on experience. This proposition provided a novel way of engaging with the collection based on the personal experience of space.

Observing the collection, the authors instinctively found the images of houses closer to where they lived. Using a similar technique to Corley, but with recent and more advanced tools, a street in the neighbourhood was 3D scanned and the information revealed its potential. 3D scanning is generally an accurate technique in that it can define millimetric definitions of space. However, conditions like changes in light and material can interfere with its accuracy. It is even more challenging to record or scan, due to movement, clutter and chaos taking place in the context of urban conditions. This resulted in a daydream-like virtual environment using the 3D scans of the street, which represented the suburban interiority in an abstract way.

The PointCloud data collected from these scans was translated into a multimodal spatial experience which abstracted how and why one may become influenced by a photograph through a digital deconstruction of the image and its subsequent materialisation. Through this deconstruction and reconstruction, the artwork exposed that photography remained only a visual dialectic if it was not experienced. Through the immersion and the use of VR, the artwork became rooted in experience and responsive to the question of how virtual reality experiences can create immersive spatial experiences of urban interiors.[10]

Psychologist James J. Gibson's concept of 'affordances' defines all action possibilities latent in the environment, which are objectively measurable and independent of the individual's ability to recognise them, but always in relation to the person who experiences and is therefore dependent on their capabilities.[11] To realise the affordances of *The One and the Multiple*, users had to understand the VR space and the activities that take place within it through experience and immersion. This new type of understanding beyond analytical thinking consisted of a balance between comprehension, sensation, and bodily perception. To reach for such understanding, there was a need to exhibit performance that questions what is new and to explore a plane of immanence. Only then could one become a fragment of its urban interiority. Deleuze and Guattari define a plane of immanence as life as it occurs, without any pretentiousness, good or bad.[12] By providing the space in its actuality, but not in its perfect depiction, *the One and the Multiple* provided a unique experience, where feelings and senses that disappeared in life's daily routines emerged through the VR spatial experience, creating a new awareness. Users became acutely aware of the artwork's projection of a new world where the multiple became the one and the one, the multiple. The personal experience gained from the artwork emerged through a lived journey within space and an obtained feeling of déjà vu.

technicity: percepts and affects of a virtual space

The genesis of *The One and the Multiple* was based on the emulation of Corley's work process, while its technicity combined 3D Scanning and Drone Photogrammetry with Virtual Reality. The aim of the artwork was to question the efficacy and functionality of gathering images and simultaneously expose users to raw data through VR (Figure 03). The new medium allowed users to directly engage with Corley's version of suburbia through visual and sonic dimensions. Analogously to Corley's work process of documenting the city, one had to be present to represent space.

Corley's work processes may be outdated by present technology, as the representation of the city provides visual and scientific integration in the digital realm. By means of representation, the replacement of photography by VR operated as a less deterministic percept, where the automated gathering of spatial data was not determined by objects or perception but was represented and experienced as a collected memory. In this manner, *The One and the Multiple*

Figure 03.
Frederico Fialho, Visualisation within the immersive Virtual Reality content, 2019.

represented an array of tools and technicity that extended and mediated urban interiority through VR, experienced by an individual percept under the *Suburban Obsession* theme.

The technicity of VR informed other means of representation such as augmented reality (AR), extended reality (XR) and mixed reality (MR).[13] The representation and experience of space became different, greater, of another order altogether. This proposition enhanced the nature of technicity, understood as a highly elastic and pervasive substance, which merged interactions between technology and the urban interior. *The One and the Multiple* offered the potential to assemble a virtual environment resulting from individual percepts and affects of space.

Through efficacy, functionality, and experience, *The One and the Multiple* placed a particular emphasis on the capture and subsequent experience of raw data. The combined technicities unfolded into the interiority of VR combined with a tectonic construct generated through computational design. These parallel embodiments departed from a 'strategy where the understanding of space dismisses functionalism and perceives forms as points where apparent known forces met invisible, ... and that reality is really the interaction of these forces.'[14] Thus, *The One and the Multiple* operated in both tectonic and virtual realms, exposing potential interactions of these forces. The technicity of the virtual space emulated Frank Corley's methodology in an automated digital version to creatively add VR strands and approaches to the understanding of suburbia. Additionally, the affordances on gathering 3D data offered seamless geometric extractions that were used in the tectonic component of the artwork.

mediated reality of suburbia

The mediated reality of suburbia as a design strategy unfolded by addressing and developing the integrated use of digital fabrication and virtual reality to represent a reality of suburban interiority. The outcomes exposed a correlation between a physical structure produced by a digital code and an interactive virtual space that was experienced through VR interaction.[15] The design methodology encompassed an overlooked relation between the virtual and the real, whereby space, media, and technology foster the importance and creativity of digital design and prototyping.

Figure 04:
Frederico Fialho, 3D Lidar scanning of the corner house, 2019.

The methodology was developed through the analysis and development of a set of parallel studies on Grasshopper (GH) as well as the integration of digital fabrication with VR systems in Unity. Grasshopper is a visual programming language that runs within the Rhinoceros 3D computer-aided design application. Due to a higher degree of general knowledge in GH, the first phase prompted benchmarking and troubleshooting, mainly on the VR systems tools. Through the combined use of Leica Lidar Scanner and Drone photogrammetry system, the focus was on correcting standard points of spatial and tracking references, allowing for the correction of more recurrent faults of the VR system. Hence, the need for a thorough investigation of the Oculus Rift headset, controllers, and importing of geometry.

The integration of the VR environment and its tectonic representation required the design of a single structure out of a modular metal wireframe. The design of the wireframe relied on the integration of geometrical patterns that emerged from a particular PointCloud data set from the 3D scanning, where physicality prevailed over virtual reality.[16] This set reflected a particular corner house which was a suburban exception due to its diagonal planning (Figure 04). In this manner, the unedited dataset offered a base hierarchy that focused on a mediated reality between immersive experience and tectonic abstract representation. Using edges for the design, the geometry of this house was appropriated and translated into the sculpture (Figure 05). The use of the edge strategy also offered structural integrity in the fabrication of the sculpture. However, within VR, structural integrity is irrelevant; thus, the geometry needed another layer of functionality to express the dynamics of continual interaction between physical and technological environments.[17] The integration of spatial mediums was overlaid with PointCloud information, and solid and

void patterns were subsequently appropriated in the sonic and tectonic forms.[18] This meant that the integration of computational design and VR became bi-directional, since structural integrity limited VR interaction, and the latter was inferred into the physical design.

The analysis of the digital fabrication components of the structure was through a topology calculator, which exposed a network of lines calculating the optimised route from line start point to line end point within a network. Through a recursive process, the initial schematic models evolved towards the final geometry of the sculpture (Figure 06). The use of this technique simultaneously provided geometric constraints and optimised the production time, since it only required wire components as material for the construction or the tectonic part of *The One and the Multiple*.

Figure 05:
Frederico Fialho, The sculpture: *The One and the Multiple* by [f]-FLATBrisbane, 300cm x 300cm x280cm, State Library of Queensland, 2019.

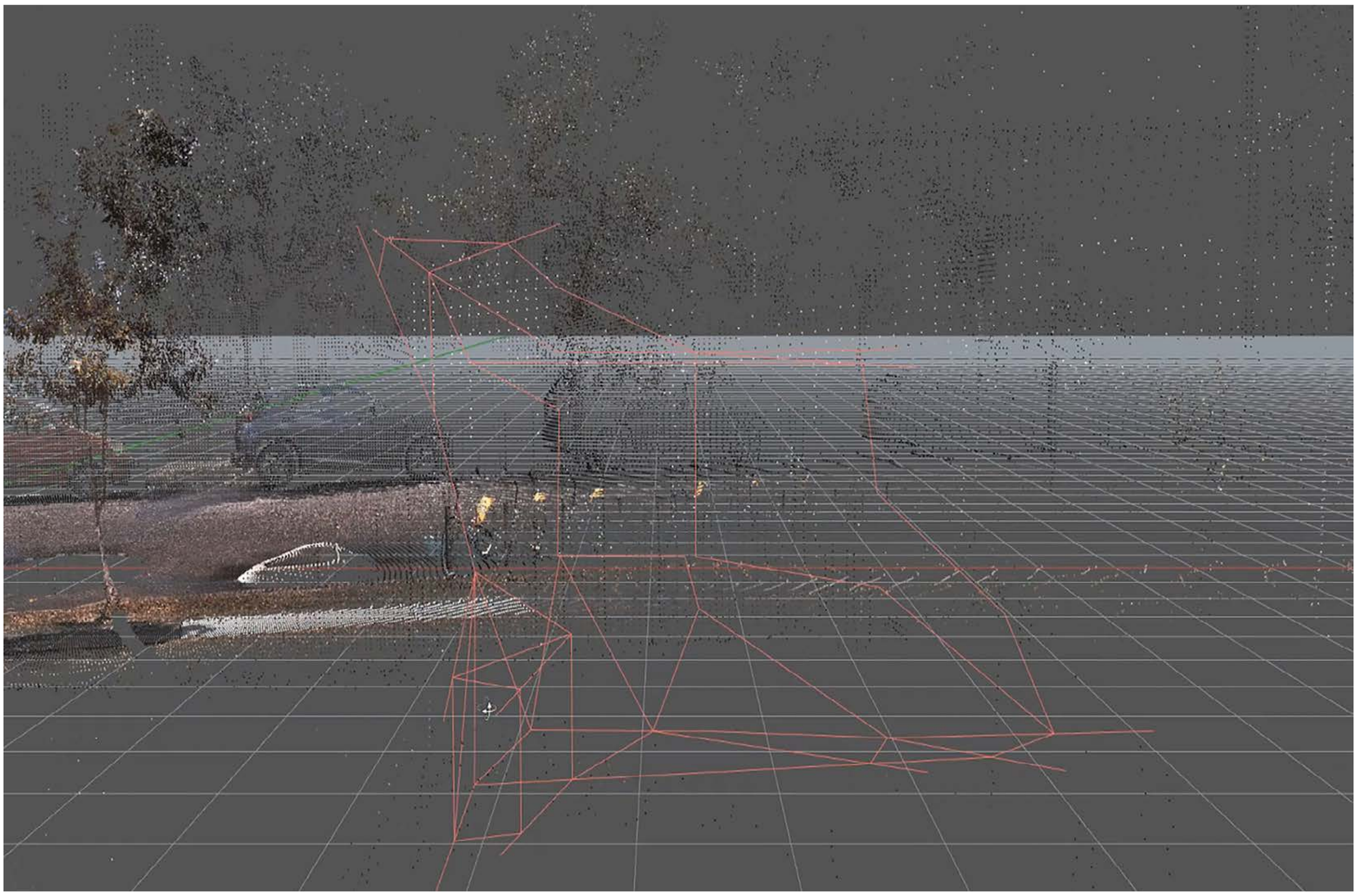

Figure 06:
Frederico Fialho, PointCloud context and topological generation of physical structure, 2019.

Operating within Unity and GH, the virtual reality developed an integrated use of digital fabrication with an interactive virtual reality environment into a single spatial system. Beginning with an overview of digital fabrication, PointCloud allowed the generation of the sculpture using GH. The same PointCloud was also used in Unity, a cross-platform game engine. The strategy quickly moved to a study of variables and concepts to form a connection between the sculpture and the VR experience. Through iterative procedures, the design of the sculpture evolved in tandem and was corroborated both in physical and virtual spaces.

The integration of the design scheme resulting from GH precisely translated a balance between the interaction intent and a tectonic return. Through the geometrical output, the sculpture unfolded its design into a series of topological definitions as

well as their translation into openGL mesh objects. Within Unity and through the use of geometric integration in virtual space and interaction (Oculus), two main graphic classes were introduced in order to define the 3D virtual space, the headset integration, and natural movement. To define the immersive environment, a mesh class was used to represent and position PointCloud geometry in the virtual space. Similar to the digital fabrication, this geometry used sets of vertices and faces, but with additional interactive traits, such as recorded sounds that increase the experience of Corley's photos. Further geometric and interaction refinement was added through the PointCloud function, which allowed one to easily travel within the virtual suburbia. This was useful for representing complex PointCloud 3D models that were not manipulated or edited, comparable to Corley's photographic collection. Lastly, with the aim of providing more natural navigation within the immersive environment, the controller was set up with 'touch-sensitive' regions within the headset's visual area. Due to the use of these core features (i.e., combining the headset with touch-reactive user interfaces), the interaction with the PointCloud became straightforward and intuitive in the virtual environment.

the urban soundscape as an experience

Beyond the combined use of 3D scanning and photogrammetry, *The One and the Multiple* also created its own technicity through the way spatial data was recorded. This microcosm of information held an additional layer and effect far greater than the sum of its all fragments—sound. What was initially the extraction of solely 3D visual data actually had the capacity to provide a multi-layered microcosm of spatial data. The extraction and subsequent addition of a sonic layer was intended to augment the *percepts and affects* of suburban Brisbane. The recording of suburban sounds was extracted from the footage used for photogrammetry and subsequently manipulated through granular synthesis to establish a formal connection with the granularity of the PointCloud representation used in the VR artwork.

Granularity exists beneath the realm of sounds and notes and in the realm of microsounds or sound particles. Recent technological advances let us probe and explore the intricacies of this world. Microsonic modular elements allow the creation of more dynamic and fluid compositions, also known as clouds or soundscapes, which can spread through space in an elemental manner. Microsounds allow one to experience sound and space in a mode of density that is constituted by pulses as a regular series of points carrying individual tones, and providing a spatial experience similar to the one of a 3D PointCloud, which resembles surfaces or textures. These elements are expressed in grains that evolve over time into rhythmic constructions of spatial sounds. Therefore, granular synthesis naturally allows the formation of sonic compositions into bottom-up organisations by piecing together systems to give rise to grander systems, analogous to a 3D point cloud. In granular synthesis, the design of particles is made within a perspective of time and frequency; however, there is also the task of composing them. *The One and the Multiple*'s soundscape was made of particles that

mediate *percepts and affects* through the raw granularity of sounds and form an analogue with the raw expression of the PointCloud.

Similar to the PointCloud aspect of the artwork, the soundscape unfolded into a series of topological definitions through granular synthesis, where solid/void patterns were exerted and subsequently appropriated in the soundscape. The topological methods of the soundscape were initiated by composing constituent parts that were interrelated voids and particles, and then bounded within spatial conditions. These conditions contained frequency and duration and evolved over time to achieve sonic transpositions of various orders. This rhizomatic structure was manifested by a soundscape that cannot be exactly definite. Its granular assembly manifested an improved permanence despite of its elemental structure. Tracing the granular element through a process of additive synthesis, the granular element required an abstraction through evolutionary sonic relations, ensuing as an atonal open work.

The initial data was adjusted to describe the emerging sound clusters in the piece, such as proximity, separation, spatial succession, area, and continuity. The topological construct

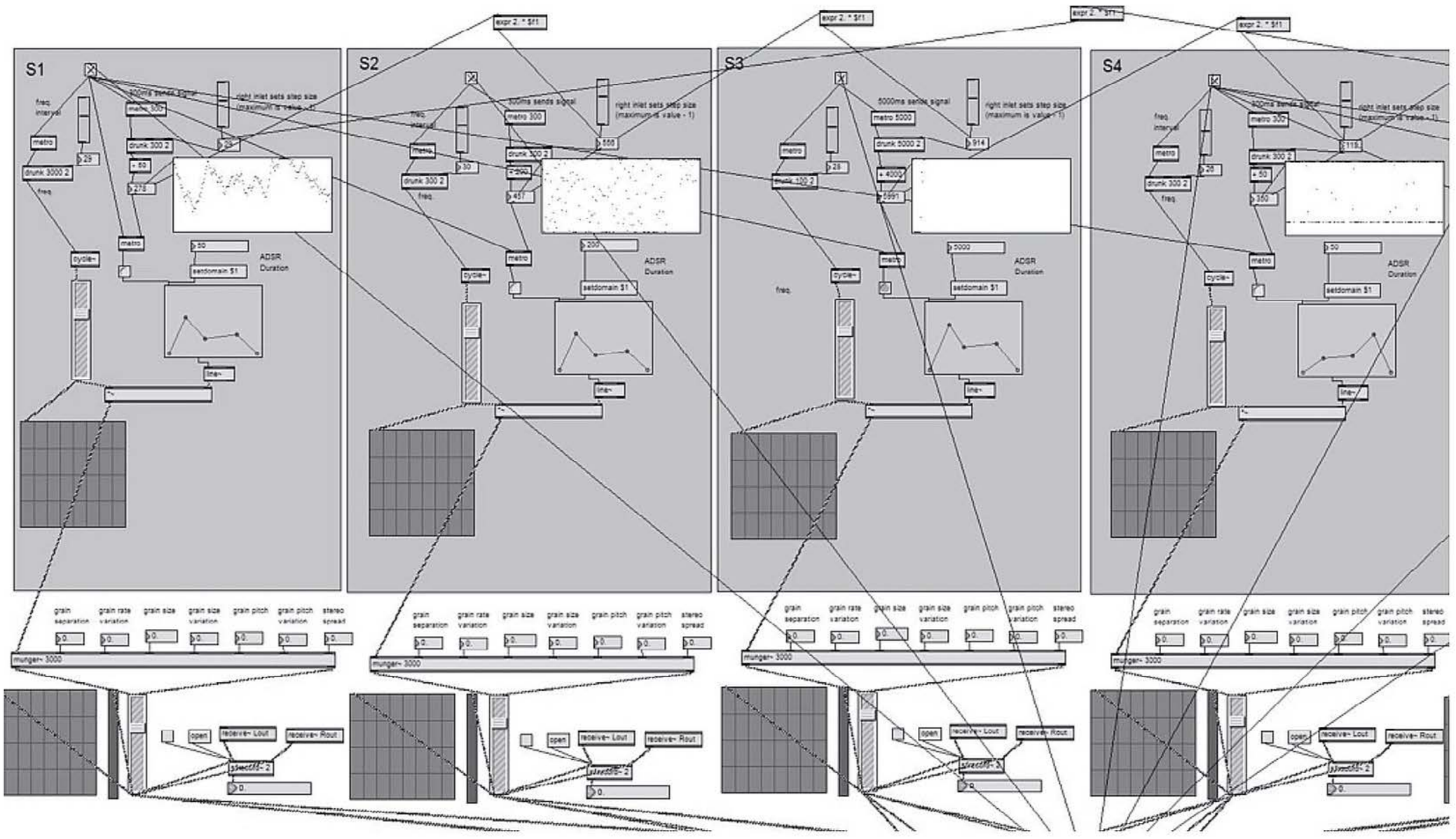

Figure 07:
Frederico Fialho, MaxMSP software environment with multiple types of linked patches. This figure shows multiple granular synthesis systems mapping the normalisation sequence (left to right), 2019.

was a dynamic patch developed in MaxMSP software. At every level, the structure of this script was based on a dynamic system, which was continuously evolving. Simultaneously, it bared the traces of its activity and extracted its own ruled-based granular strategy (Figure 07). The validation for the usage of differential equations was attained by the translation of feedback loops and flowed from the self-organised soundscape. Consequently, these values continuously iterated through genetic procedures after self-organisation achieved a state of normalisation.

The decomposition of the original recordings became a map of its original process, as synthesised scripting performances evolved into initial intuitive responses through spatial techniques such as triangulations, stratifications, repetitions, or formal microsounds such as strips, sine waves, or spirals. The granular composition was only experienced within the VR headset, thus enhancing the immersive experience and the intimate relation of virtual reality and its most inherent quality, interiority. A quality that worked as a portal to connect actual and virtual mediums, allowing simultaneous becomings with different scales, fictions, dimensions and conceivably an empirical space.

The use and main purpose of the soundscape in *The One and the Multiple* was to extend, augment, and alter the experience and representation of space. It used the medium of virtual and actual through a multimodal and virtual intensity. Through the interactive structure of the artwork, the audience was expected to collaborate with space to encounter new becomings. It was believed that, using intuition, they would be able to reach out to the hidden dimensions of space.

conclusion

The One and the Multiple design process unfolded design and code development by addressing the integrated use of digital fabrication and virtual reality. The artwork exposed a correlation between a physical structure produced by LIDAR and drone photogrammetry and its interiority experienced through virtual reality. The work aimed to reveal an overlooked relation between the virtual and the real, where the city, media, and technology foster the importance and creative integration of multimodal design and fabrication. The significance and innovation of the artwork transposed the emerging fields of VR into urban interiors, whereby information became a digital connection between locations, people, and activities. The authors believe immersive environments could graphically illustrate what is happening (where, how, and why) and provide insight into the impact of past, present, and future forms of experiencing spaces.

By exploring the often-opposing relation between the virtual and the real, *The One and the Multiple* combines space, media, and technology to foster the creation of future-mediated realities. By operating from a specific context and technologies, the process offered an understanding of a contextual environment and used this data to extensively interact with a proposed experience. *The One and the Multiple's* methodology explored

linear and nonlinear correlations between virtual and physical spaces. These were only possible through the combined exploration of spatiotemporal forms of communication that directly involve design prototypes at a computational and interactive level. These mediated realities seek to develop novel design proposals that correlated spatial systems across VR and the urban interior. Overall, the research served as a baseline for the development of various other works that were both abstract and specific enough to be scaled, augmented, and modified as needed. The bi-directionality of the definition facilitated experimentation with the form and structure of works developed, using a computational and interaction design construct. In this manner, multimodal aspects could be readily exchanged with each other, leaving only the specifics of second-order cybernetics and other contextual considerations open for later definitions.

acknowledgements

We would like to acknowledge Adam Jefford and Chenoa Pettrup from the State Library of Queensland, who invited us to contribute for the *Home: Suburban Utopia* exhibition. We would also like to acknowledge the participating team who contributed to the development of the work: Shuwei Zhang through his drone capture and photogrammetry support, and Ben Ziegenfusz for his continuous input on VR and photogrammetry.

[f]FLAT would like to acknowledge the Turrbal and Yugara, as the First Nations owners of the lands where [f]FLAT now stands. We pay respect to their Elders, lores, customs and creation spirits. We recognise that these lands have always been places of teaching, research and learning. We acknowledge the important role Aboriginal and Torres Strait Islander people play within our community.

author biographies

Dr Müge Belek Fialho Teixeira is a Senior Lecturer in QUT Interior Architecture and one of the Chief Investigators of QUT's Design Robotics and ARM Hub. She is a creative maker and transdisciplinary designer with specialisations in advanced manufacturing, digital fabrication and parametric design. She holds a BSc in architecture, an MSc on 'Collaborative Design Studio Environments' from ITU, and an MArch from AADRL, London. Her PhD from ITU focused on Trans-Architectural Design, during which she studied with Marcos Novak in UCSB, Translab. She has worked in several architectural firms, including Zaha Hadid Architects. She is the cofounder of [f]FLAT.

Dr. Frederico Fialho Teixeira is an architect, media artist and academic currently at University of Queensland School of Architecture. He holds an MArch from the Architectural Association School of Architecture and a PhD in Architecture. His academic experiences include being researcher and Awarded Fellow at University of California Santa Barbara in the department of Media Art and Technology, based at the California Nano-Systems Institute. Professionally, he has worked for architectural practices that include Zaha Hadid Architects, and presently is the cofounder of [f]FLAT. His studies fall into the area of pan-computational Architecture and New Media Arts with a focus in Biological Paradigms.

notes

01 Alain Badiou, *Being and Event*, trans. Oliver Feltham (New York: Continuum, 2005), 23–30.

02 Frank and Eunice Corley, *Home: Suburban Obsession* Exhibition, Corley Explorer, State Library of Queensland, Brisbane, 2018.

03 'Corley Explorer,' State Library Queensland, accessed June 28, 2020, https://explorer.corley.slq.qld.gov.au/.

04 *Home: A Suburban Obsession*, State Library Queensland, accessed June 28, 2020, http://home.slq.qld.gov.au/.

05 *Home: A Suburban Obsession*, State Library Queensland, accessed June 28, 2020, http://home.slq.qld.gov.au/.

06 Henri Bergson, *Time and Free Will: An Essay on the Immediate Data of Consciousness* (New York: Dover Publications, 2012), 85–89.

07 Gilles Deleuze and Felix Guattari, *What is Philosophy?* (London: Verso, 1994), 163–201.

08 Richard Sennett, [Harvard GSD] (2016, April 26), Interiors and interiority [Video file], accessed 27 June 2020, https://youtu.be/hVPjQhfJfKo.

09 Liz Teston, 'On the Nature of Public Interiority,' *Interiority* 3, no.1 (2020): 61–82, https://doi.org/10.7454/in.v3i1.72.

10 Müge Fialho Leandro Alves Teixeira, and Frederico Fialho Teixeira, (2018) *The One and the Multiples* [Artefact], https://eprints.qut.edu.au/128596/.

11 James J. Gibson, *The Ecological Approach to Visual Perception* (Boston: Houghton Mifflin, 1979), 127–143.

12 Gilles Deleuze and Felix Guattari, *What is Philosophy?*, 35–60.

13 Yosee Feldman and Ehud Shapiro, 'Spatial Machines: A More Realistic Approach to Parallel Computation,' *Communications of the ACM* 35, no.10 (1992): 60–73.

14 Frederick Kiesler, 'On Correalism and Biotechnique,' *Architectural Record* 86, no.3 (1939): 60–75.

15 Michael Fox and Miles Kemp, *Interactive Architecture* (New York: Princeton Architectural Press, 2009), 162.

16 Kas Oosterhuis, Lukas Feireiss, Minke Themans, *GameSetandMatch II: The Architecture Co-Laboratory on Computer Games. Advanced Geometries and Digital Technologies* (Rotterdam: Episode Publishers, 2006), 88.

17 *The One and the Multiple* used an open systems strategy as proposed by architect Frederick Kiesler. These forms of interaction with other spaces require another level of integration distinct from tectonics. Frederick Kiesler, 'On Correalism and Biotechnique,' *Architectural Record* 86, no.3: 60–75, 1939.

18 Gerrit Kahl, Christian Burckert, 'Architecture to Enable Dual Reality for Smart Environments,' *IE'12 Proceedings of the 2012 Eighth International Conference on Intelligent Environment, Guanajuato* (2010), 42–49, 2012.