CURATION
Karen Cochrane
Thecla Schiphorst
Deborah Turnbull Tillman

EXHIBITING ARTISTS
Sojung Bahng, Sungeun Lee, Nina Rajcic and Jon McCormack
Bert Bongers
Yulia Brazauskayte
Louis Chew, Karen Cochrance, Luke Hespanhol and Lian Loke
Abhiruchi Chhikara, Florencia Diniello and Iskra Uscumlic
Ernest Edmonds, Damian Hills, Yi Ji and Xin Tong
Sang-won Leigh, Abhinandan Jain and Pattie Maes
Marius Hoggenmüller and Luke Hespanhol
George Poonkhin Khut and and Callum Howard
Wade Marynowsky, Sam Ferguson, Angelo Fraietta and Oliver Bown
Claudia Núñez-Pacheco and Jorge Olivares-Retamal
Nina Rajcic and Jon McCormack

PERFORMING ARTISTS
Alon Ilsar and Matthew Hughes
Mary Mainsbridge
Caroline McMillan
This year’s art exhibition for *Tangible, Embedded and Embodied Interactions* is inspired by a hopeful co-mingling between art and technology with the site being our future bodies, our future selves. The idea of a palindrome, a phrase that is the same spelled forwards and backwards, nods to the idea of meeting in the middle. Transhumanism, cyborgs, engineering experiments, and designed interactive engagements have existed in past science fiction, film and literature, often pointing to a dystopic future. What we aim to present here is a collection of works by experimental artists and performers who congregate in the present but draw on ideas of the future through aesthetics of the past.

What emerges is a landscape encoded with two-way messages and filled with two-way journeys. Visitors to the gallery can lose themselves in an infinity mirror, read chalk messages from a robot, transmit portraits of themselves, travel into paintings through virtual reality, transport their mindsets with scent, a pulsating heart or projected aura, rock in tandem with a hidden collaborator and dance with distributed and autonomous robotic roller skates.

Join us in this futuristic blast from the past, where the possibilities are endless and optimistic, but not quite polished. It is a future that is *Never odd or eveN.*
Where does human agency remain in the era of automation and intelligent machineries? Technological affordances create instant ways of accomplishing challenging tasks, where a lot of individual agency is mitigated. In this installation, we present an autonomous musical instrument that invites people and volunteers to eventually take a subordinate role. Over time, the instrument gradually raises its level of autonomy, eventually overriding through musical patterns impractical to play by users. Juxtaposing machine uprising and an artefact which manifests human creativity, we question the relationship between technology and human on the continuum of symbiosis and adversary, through orders of algorithmic complexity and intensity in the act of music.
Rayuela is an interactive light installation created with the purpose of using art to draw attention to a serious issue plaguing our society: namely plastic usage and waste, and how its overuse and under recycling end up polluting the oceans and compromising the food chain by disintegrating into microplastics. To create an experience that could be playful enough to attract and engage people, while still subtly conveying a serious message, we chose the game of hopscotch as a backdrop for a playful experience, revealing at each step the journey a plastic bottle goes through during its lifecycle. Accordingly named the work Rayuela, which is the Spanish word for hopscotch. We built Rayuela as a modular system consisting of 11 light boxes, each telling a different fact about the plastic bottle’s journey. Each time people jumped on a box, it turned the next one on, thus progressively revealing the story. As the work was designed for exhibition in a very large public festival lasting about a month, design considerations ranged form aesthetic and interactive aspects to robustness and reliability. In this paper, we describe the conceptual rationale for Rayuela, its design and building process, and the methods for automated data gathering we implemented. We then present the results of the field study, and discuss preliminary findings, as well as implications for future design.
This paper describes the technology, concepts and development of Computer Storm, a live audio-visual piece created for a gestural instrument, the ‘AirSticks’. The AirSticks were designed to allow the composition, performance and improvisation of live electronic music and graphics using movements captured by handheld motion controllers. In this piece, the AirSticks are combined with commodity depth sensors, and a custom visualisation system ‘Confluence’ which generates graphics from music and motion in real-time. The hardware used to display the images throughout the performance space is also described, as well as an overview of the resulting performance, which explores harmony across music, visuals and movement, and investigates our complex relationship with technology.
The project investigates how interactions with complex (biologically inspired swarming) behaviors of multiple robots are understood by human participants within a performative and dramaturgical system. Nonanthropomorphic robots in the form of roller skates are used in innovative ways by creating social formations from their movements, for example, a leader and followers in a conga line. Synchronized audio signals and speech-like sonic structures are used in innovative ways by influencing and engaging the participant's interactions with the robots. Localization data of the robots in space is mapped to control the surround sound and lighting within the space. This is used to enhance audience immersion and engagement within the interactive performance work.
The aim of this art-based research is to explore the duality of embodiment and presence in virtual reality (VR) through a narrative about the South Korean narcoleptic artist, Sungeun Lee. Narcolepsy is a neurological disorder where a person falls asleep unexpectedly. A narcoleptic struggles with a blurred and unsure sense of self, as well as confusion between reality and dreaming. We used VR to simulate his traumatized dream world and symptoms of narcolepsy. However, we also investigated the fundamental duality of embodiment/disembodiment in the virtual space and its parallels in the dream world. A non-linear narrative and generative poetic aesthetics driven by biometric feedback were applied to represent a surreal and uncertain sense of self. Gesture-based navigable interaction was used to connect people with their physical bodies, the virtual environment, and Sungeun’s experiences.
Mettāmatics is an interactive sound sculpture that uses heart-rate-variability biofeedback to support participants to observe and experiment with very slow variations in heart rate patterning that can be voluntarily elicited through feelings of compassion, benevolence, gratitude and equanimity, coupled with relaxed, effortless breathing.

In this paper I introduce arts-based health promotion as a context for designing and presenting body-focused interactive art, and consider the challenges for supporting participants to psycho-physiologically enter 'into' — a work designed to explore this unfamiliar and highly nuanced example of body-mind connection.

I describe the methods used to analyse the pulse sensor data, how the features extracted from this data were used to control the various elements of the interactive soundscape, and outline approaches I have developed for supporting participants to 'find their bearings' within the work, through the incorporation of pre-recorded verbal cues, and questions designed to support participants to more clearly perceive their agency within the work, and their nervous system more generally.

Acknowledgments: This iteration was developed with the support of UNSW Art & Design’s Interactive Media Lab, Acme Framing and DADAA WA Gallery.
This work is the part of my ongoing Practice-based PhD that explores ways of making people feel more connected across geographical distance. My research proposes to reconsider the view of mediated communication as disembodied sending-receiving of information that is missing contextual and bodily aspects. Through my experimental practice I aim to reinforce characteristics of our embodied existence and allow dyads (two people) to communicate over distance in a dynamic, co-regulated and ambiguous way without the use of explicit written language or speech. This paper describes the first experimental work - Undūla. It aims to test the hypothesis that: connectedness can arise from a jointly attentive dynamic body movement coordination. The experimental work features two identical custom-made rocking chairs with a sonified movement feedback (ocean waves). The chairs will be placed in separate locations allowing participants to coordinate their movement through a mutual self-paced rhythm over distance with no visual feedback.
Sounds of Infinity is an interactive, low-resolution lighting display that portrays a magnified variation of the infinity mirror. Developed for an outdoor light and music festival, the installation provides a retro-futuristic experience for audiences and explores how playful interactions might impact the behaviour of people in public spaces. Using multiple layers of LED lights, the concept enhances the infinity mirror illusion with a variety of audio-to-visual effects to create a tunnel of interactive light visuals. Due to its intuitive design with sound input, Sounds of Infinity also allows for open exploration of the body to produce sound through voice and movements. It illustrates the timeless quality of light and sound to promote social harmony, connecting and engaging people in collaborative, fun and expressive play.
**Aura:maton** is an immersive performance that allows audience members to explore ephemeral scent worlds with one dancer wearing a networked, olfactory wearable. The performance evokes the memory of the smell of fresh rain on dry earth, known as petrichor. A dancer wears an IoT-connected, olfactory-emitting wearable as she navigates a room-scale environment, projecting dynamic olfactory display. The dancer wears an EEG (electroencephalography) sensing headband connected to a custom-made leather harness scent 'minilab'. She develops direct communication with each of the five scent vials on the harness, coded to playback the electrical activity of the brain and choreograph an autonomous scent symphony. *Aura:maton* can be presented as an art installation, as well as an immersive performance of scent-induced trails of the dancer's scent memories, passing by the audience.
This artwork exploits recent research into augmented reality systems, such as the HoloLens, for building creative interaction in augmented reality. The work is being conducted in the context of interactive art experiences. The first version of the audience experience of the artwork, “H Space”, was informally tested in the 2018 Art Gallery context. Experiences with a later, improved, version was evaluated at Tsinghua University. The latest distributed version will be shown in Sydney. The paper describes the concept, the background in both the art and the technological domain and points to some of the key computer human interaction research issues that the work highlights.
The Tangible Landscapes range of interactive audio-visual and sculptural pieces offer audiences opportunities to explore abstract landscapes, recreating an embodied experience of the materials, through tangible interaction with found objects. New meanings and new narratives can emerge from the individual and social, intimate and spatial, interactions and explorations.
Mirror Ritual is an interactive installation that challenges the existing paradigms in our understanding of human emotion and machine perception. In contrast to prescriptive interfaces, the work’s real-time affective interface engages the audience in the iterative conceptualisation of their emotional state through the use of affectively-charged machine generated poetry. The audience are encouraged to make sense of the mirror’s poetry by framing it with respect to their recent life experiences, effectively ‘putting into words’ their felt emotion. This process of affect labelling and contextualisation works to not only regulate emotion, but helps to construct the rich personal narratives that constitute human identity.
Magnetic Springs is a musical performance that investigates links between the tangible and intangible through virtual and physical artist-designed instruments that transform human actions into sonic and visual form. It features the Telechord, a polyphonic theremin controlled by whole body movement, and a magnetic spring instrument constructed of contact microphones and two steel slinkies. Both systems are designed to encourage play, improvisation and self-awareness through the body, the ultimate truth-teller. The piece builds on the author’s practice-based research exploring the role of instrument metaphors in structuring improvisational environments and finding correspondences between whole body movement and sound creation. Movement improvisation is a powerful tool not only for developing novel choreographies but also for conceiving and crafting sonic ideas. It fosters physical awareness while refining the movement nuances of the performer. The interfaces used in Magnetic Springs encourage minimal, slow and gradual movement. They tune the performer to the slightest shifts in posture in relation to pitch and reverberance, refining the auditory, vestibular and visual senses simultaneously. The work embraces the potential of conscious embodied engagement in performance to promote self-reflection and idea generation.
Pulsante (translates as Pulsating) is a new-media device representing a large-scale model of a human heart. It captures the essential elements of the organ to highlight a clear visualisation of the circulatory system. The aims of this transdisciplinary work are: (1) To allow the audience to connect with themselves and others, fostering conversation and curiosity, and (2) to function as an educational device, showing the rhythms of the heart by following scientific conventions. Aspects such as artistic expression and their situated metaphors, invite audiences to perceive the heart as a collective force. As the installation adapts its behaviour to the pulse of the person interacting with it, we also introduce small elements of situatedness, adapting the piece to the particularities of the place where it is exhibited. Finally, in terms of research questions, we seek to understand: How the audience reacts when they visualise a piece of information that usually remains hidden to their sight? How does the presence of others influence their reception?
This paper presents the design of Woodie, a free-moving urban robot which draws on the ground with conventional chalk sticks, using the public space as a large art canvas. We outline the motivation and design considerations, which led the design process of the lightweight robotic device aiming to stage creative placemaking activities. Along this path, we relate to the various roles of ‘embodiment’ apparent in this placemaking investigation, such as the robot’s physical appearance and coupling with the urban environment; the engagement of visitors into natural tangible interactions; and their involvement of physical activities around the precinct. We discuss our observation on how those embodied interactions emerged, and further elaborate on them as perspectives to inform future work.