The Arts x Tech Lab 2021 is the National Arts Council (NAC)'s inaugural innovation lab that fosters collaboration between the arts and technology sectors. The Lab is designed to empower creatives, artists and technologists to engage in innovative experiments and collaborations. It also aims to build capabilities, co-drive innovation and support changemakers from within the arts and technology sectors.

Technology Partner Keio-NUS CUTE Center, co-designed the Lab and continues to provide technology mentorship and consultancy to the participants of the Lab. The Lab is led by an NAC-commissioned project management team.

What is the Lab's focus?

The Lab focuses on supporting arts-technology ideas and proposals across two tracks. The Lab's participants have addressed <u>one</u> of following six challenge statements.

Track 1 – Open

- A. With the current pandemic forcing artists to think about delivering arts to audiences, how will technology help you **reimagine your practice and find new ways to reach audiences** both in live and virtual settings?
- B. What creative solutions can art and technology offer to **connect people from different generations, cultures, abilities or languages**?
- C. What is the **art/performance space of the future? How can this be integrated to enhance or re-imagine the experience of a space, or even a city**?

Track 2 – National Museum of Singapore

- D. How can new digital media and **technology be employed to blend artistic experiences and heritage**?
- E. How can technology offer **audiences and visitors new perspectives in experiencing the National Collection**? Click [this link](#) for access to the collection.
- F. How can technology and the arts **enhance museum-based learning** and discussions?

How does the Lab work and what are the expected deliverables for participants?

Through an Open Call conducted in early 2021, 10 final participants are selected to undergo the eight-month lab, scheduled from June 2021 across two phases, which culminates in an industry sharing planned for January 2022 (final date to be confirmed).

Each phase is shaped according to the level of readiness of the participants and customised with their proposals in mind. Throughout the Lab, group activities including a mid-point sharing are conducted to support the participants' learning as well as consultation and guidance offered as needed, on top of funding support for each phase.

In the second phase, participants develop a prototype, proof of concept, work-in-progress experience, or minimum viable product, which will be shared as part of the final industry sharing.

The Lab offers the following to all participants:

- **Consultation** on your project proposal
- **Networking opportunities** with potential collaborators
- **Workshops by experts** in topics such as production development, tools for art creation, accessibility and inclusivity, and user experience.
- **Peer learning opportunities** to learn from like-minded artists and technologists
- **Feedback** from an expert arts and technology panel
- **Access to external resources** and technologies
- **Funding support**

Final Participants of Arts x Tech Lab 2021

1. Architects of Realities

"Architects of Realities" is a pilot program for an intermedial performance dramaturgy lab exploring how directors research with actors in live performance, using immersive digital technology such as projection mapping and virtual reality. This program experiments with the future of performance space by investigating the collision of bodies and technology through the existing methodologies and practices of actor-training. The experiments involve overlapping multiple virtual spaces on the physical space of the body to question the duality between live/ real (phenomenological) and fictional (semiotic). By observing the cycle of influence and response between the actor's body and technology in a series of eight (8) Practice-as-Research sessions, we hope to discover elements that culminate in a few alternate methods of immersing the actors and audience into an experience of multiple realities. Is there a way to bring performance to unconventional theatre spaces, real or virtual? Our industry sharing will take the form of a workshop facilitated with/ through technology by the program's artists, targeted at existing theatre students and actors, with an aim to make meaning of the relationship between technology and theatre, and question how this discovery may inform the participants' art work in future. A wider audience (live in physical attendance or streamed in) will be welcomed to observe this workshop and listen in to the artists' sharing of the process as well.

2. Bao Songyu | MARCS (Multiple Action and Reaction Control System)

Modular Action and Reaction Control System (MARCS) is a programmable ecosystem of modules designed for electronic prototyping in the execution of artistic projects. MARCS aims to streamline the use of electronic hardware, equipping users with platforms to create extensive and efficient control and communication systems. The objective of MARCS is to lower the technical barriers of manoeuvring electronic hardware, targeting users from creative disciplines who are limited by existing technological tools. A key feature of MARCS' platforms is modular communication, allowing for data-flow across multiple boards within a network. This enables users to expand the control of sensors and actuators used in interactive devices and installations, making set-up and troubleshooting more efficient. MARCS modules are also made compatible for serial communication with visual and multi-media software such as Processing, TouchDesigner and MAX msp for digital artists. With flexible communication and multiple control functions built into one wireless and comprehensive tool (Albatross), we see the application of MARCS in the execution of large-scale kinetic installations, interactive or performative works. A community of projects that use MARCS begins with works 'Entropy' which tests inter-network communication and 'Moving Heads' which explores complex data processing and real-time actuation.

3. Chinese Opera Centre | The Evolution of Traditional Art with New Technologies

Historically, Chinese opera was performed in outdoor spaces or in tea houses with noisy audiences and street peddlers. Under those circumstances, the musical instruments needed to rise above the environmental sounds to reach the audience. Today, Chinese opera is performed in welll-equipped modern theatres that are not just quiet, but soundproof with audiences maintaining absolute silence. In this modern context where technology and audiences have evolved, the instruments and performance mode of Chinese opera has yet to adapt, causing today's audiences to find the art form noisy, and musicians finding themselves experiencing hearing problems. This project seeks to modernise how Beijing Opera is performed through experiments in audio efficacies. The team is experimenting with the use of sound-absorbing materials with traditional instruments, re-positioning of musicians to eliminate frequency clashes, and experimenting with a remote accompaniment or dual-stage concept with advanced audio technologies that cater to audiences with different needs.

4. Christian Teo | Folko: Storytelling Reimagined

Folko is an audio-based, publicly available app which reimagines the Spoken Word through shared storytelling. By contributing and tuning in to short-form audio 'chapters', storytellers join interconnected narratives on a myriad of themes, including *Day in the Life of*, *Late Night Musings*, *Good old' Days* and *Wanderlust*. Folko will explore the creation of niche "story channels" for organisations. For the National Museum of Singapore, "*the day Sang Nila Utama stepped into a time machine*" is being conceptualised to reimagine the experience of our National Collection. Where visually-intensive platforms sacrifice authenticity for virality, Folko uses audio to amplify the immediacy and intimacy of emotive storytelling. Where podcasts and audio platforms prefer 'closed door' expert monologues, Folko celebrates creative collaboration and stories from the 'man on the street'. Folko's street-friendly user experience and rapid story-recording sessions allow storytellers to easily partake in stories

on-the-go. Folko will carve a space where storytellers are nurtured, feel safe to share their experiences, and celebrated by global audiences. With the release of our 'open beta' in December, we are excited to welcome the voices and perspectives of Singaporeans across generations and backgrounds. In 2022, we look to bring Folko to content creators and users globally.

5. In Tempo Silico

In 2021 we are entering a new paradigm in which increasingly-powerful technologies are enabling increasingly- sophisticated collaborations between people and machines, and remote performance via the web is becoming a key ingredient. In Tempo Silico aims to explore a novel music collaboration paradigm involving live musicians performing advanced electronic instruments plus an AI music partner - a human/computer collaboration for the COVID and post-COVID world. The fundamental research for the AI system was developed in Prashanth Thattai's academic work on MASSE, a system for real-time human-machine improvisation of rhythmic Carnatic music (NUS, 2020). MASSE provides complimentary rhythmic support to human musicians in laboratory settings. We are collaborating as a team of artists, academics, technologists and entrepreneurs to use and extend it across diverse performance scenarios alongside other innovative performance technologies, developing a real-time web-based performance. The outcomes of the collaboration include performances with visual and sonic elements involving human improvisers using and collaborating with a range of technologies. Through experiment – technical development as well as improvising and writing music together – we aim to deliver strikingly dramatic and innovative performances, to identify the potential of the system in music and music-technology education, and to explore avenues for future commercialization.

6. Justin Loke | History Without Words

As a departure from the linear interpretation of history into more viewer-centred narratives, this project merges new media technology with art history methodologies. The project will discuss possibilities such as gamification of the museum experience, integrating the element of 'play' into the audience's phygital engagement. The interactive visual narrative with be modelled on a literary form known as 'speculative fiction' where fiction and history are weaved into our reality and consciousness. Through focusing on the historical painting 'The Esplanade from Scandal Point' and its watercolour predecessor, the project expands art analysis into a more open-ended method of thinking-via-imagining. The numerous discrepancies between the two paintings create room for discussion that can be prompted through the creative use of storytelling and user interaction. In the proposed web app, the target audience will be able to experience text-based storylines, point-and-click clue finding, atmospheric audio, all presented in an aesthetically designed interface. The experience will ultimately lead to the last piece of missing information that needs to be unlocked, whether through AR or QR scanning of a physical object, in the museum itself, thereby bringing countable footfall that reflects the level of engagement the project has achieved.

7. Making do and getting by | speak your mind

speak your mind is about encouraging creative self-expression, sharing thoughts and stories, interacting meaningfully with peers and the community amongst children with special needs. We hope to develop digital tools for alternative communication and expression

available to this community. For this project the focus is on drawing (using digital means) and finding the right words to express a thought/a story. Our process will be guided by the childrens' interactions and responses with the tools. We will run a series of online, hands-on experience sessions with participants to experiment with the prototypes we develop.

1. Hand Gesture and Movement driven user interface (using only the webcam on a computer or laptop) to select and move objects on the screen, as well as on an experimental drawing interface.
2. An Augmentative and Alternative Communication [AAC] app add-on that aims to play a supporting role in communication, informed by machine learning and word prediction to say what is on your mind whilst on the go. It is not intended to be a holistic AAC system for language learning.

We intend to publish the thought process, materials and tools used, and results from the experience sessions as a potential source of information for the community.

8. Spang & Lei | A Space for Digital Attunement

A Space for Digital Attunement is a durational performative experience using biofeedback loops from brainwaves of live audience-participants (*Attunees*). Two *Attunees* seated across each other, connected via the *Attunement Apparatus*. This interconnector captures and transforms live brain signals into transitory light and sound compositions. *Attunees* are guided by a performer-artist (*Attuner*) through a three-stage experience. Stage One - Sedimenting; *Attunees* will enter into the *Attunement Apparatus* by adorning electroencephalogram (EEG) headsets. Light and sound in the environment will be orchestrated based on both *Attunees* incipient brainwave signatures. Stage Two - Swirling; the *Attunement Apparatus* will initiate contact between *Attunees*. Both sets of brainwaves will be *swirled* into *Attunement Apparatus* to form a collective light and sound representation of their thoughts. This is the moment when *Attunees* are encouraged to "start a dialogue" with their counterpart via their thoughts. Finally, in Stage Three - Dispersing; *Attunees* can continue their "mind" conversations for as long as they please until they choose to unhook themselves from the *Attunement Apparatus*. What happens when two strangers are connected remotely via EEG headsets? Can one communicate without words and gestures; using only our thoughts? Is it possible for two minds to be in the moment simultaneously?

9. T.H.E Dance Company

The recent acceleration of digital and hybrid performances has propelled T.H.E Dance Company to explore high-quality, real-time livestreaming alongside live shows that the Company regularly stages. This has enabled us to reach overseas audiences who previously might not have had such immediate access to our live shows, as well as local audiences who may not have been exposed to our works before. Yet, in such explorations, we are realising that our streams are sometimes lost in the sea of various digital content options available on the same platform. There are also inherent limitations to such livestreams — the audiences are often limited by what our cameras capture, and compelled to watch the angles and perspectives that we offer, without having the freedom to turn their gaze onto what is not captured on screen for them at the moment. Together with our immersive technology partner Hiverlab, we are experimenting with the possibility of real-time 360°

livestreaming, viewed in virtual reality, offering an in-theatre experience of an immersive dance performance without having to step out of the house. Could this be the next best thing to physically attending a live show?

10. Tusitala Books

What might a digital experience of an illustrated story look like, using immersive technologies? To explore this question, we are prototyping an interactive installation that uses Microsoft HoloLens 2, projection mapping, and immersive audio to present scenes from Singapore's history in a panoramic format. By considering how extended reality technology can be used to present multiple narratives against a single backdrop, we aim to devise new ways of storytelling that help cultural institutions make better use of unusual, underused spaces (e.g. corridors, stairwells, areas with curved or slanted walls) and transform these into sites for imaginative, reflective encounters. Our project team includes: Tusitala, HelloHolo (XR tech partner), d&b audiotechnik (audio tech partner), Ng Xiao Yan (illustrator), Ng Yi-Sheng (writer), and Guo Ningru (sound designer).