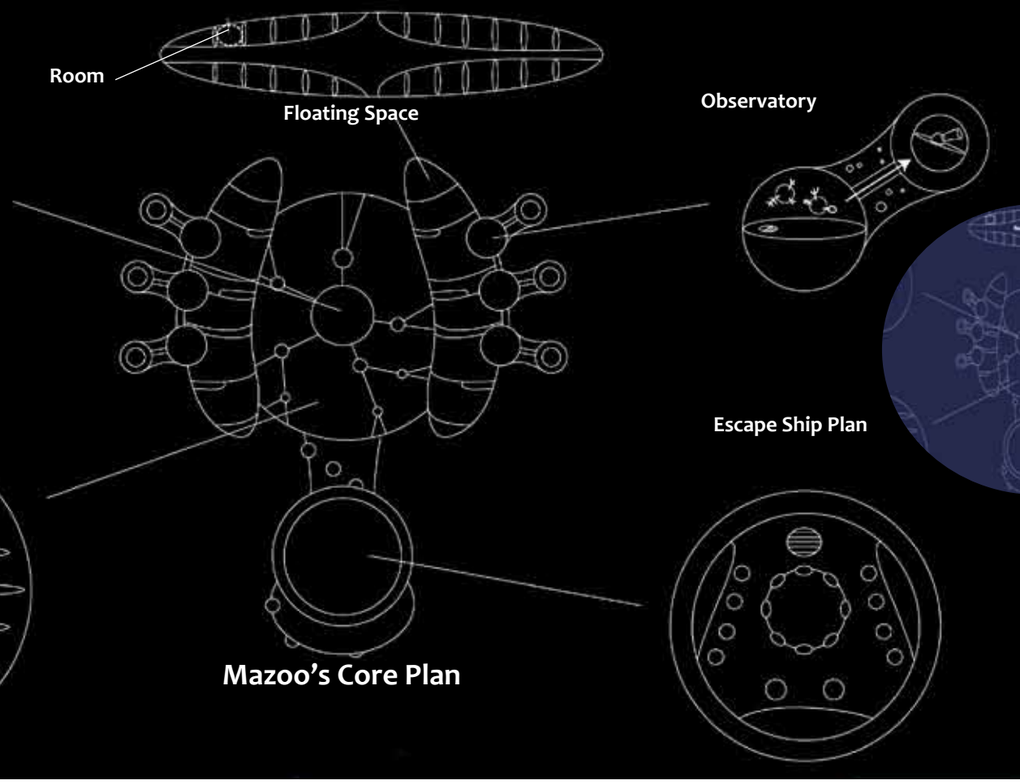
Orchids

'Anything but Ordinary'

MAZOO



mazoo.space

Mazoo, a mythological science-art spaceship laboratory travelling the galaxy (in this case the internet) on its journey, sharing knowledge of the wonderful Orchid plant species. Eight artists from the National Cheng Kung University (NCKU), now in orbit on the Mazoo Spaceship, collaborate with the Orchid Research and Development Center (ORDC), exploring the world of Orchids and bringing this science-art project to fruition. Following extensive lab' and field visits, each artist has embarked on an individual research theme and teamed up with a research partner at the ORDC to develop content that is captured and translated through their own creative inspirations, influenced by the beauty and life of the Orchid and the science and innovation at ORDC.

Mazoo, the concept was conceived as a method of bringing art and science knowledge together, a place of artistic works accessed through the various areas of the ship, with a direct link to the research of ORDC. Although these works exist 'virtually', each artist has also engaged in their concepts to be developed for physical installation, photographic works, composition and design products, should we wish to pursue these directions. Our aim in creating Mazoo is to spread the word about Orchids, accessible to a wide range of people (arguably to alien species as well, since we are a spaceship) and as a means to find out more via *Mazoo* and ORDC.

Background: The Techno Artists (Practice of Techno Art 1051) together with their Professor, Eleanor Gates-Stuart, contacted Professor Hong-Hwa Chen, Director of ORDC, to find out more about the research of the Orchid Research and Development Centre. Professor Eleanor was aware of its reputation via its involvement in the Taiwan International Orchid Show (TIOS) in Tainan and had also heard of the research work of ORDC back in her homeland of Australia. Since Professor Eleanor's own research specializes in media arts, communication, technology and innovation, the opportunity to introduce the Techno Art students to the scientific research at ORDC has been truly amazing for everyone involved. Mazoo is a means to convey the special relationship between art and science, with artists and scientists each communicating their practice and scientific research. The artworks evolve as works in their own right rather than attempting to illustrate the science. The difference is that the art is based on scientific knowledge in its conception, fused with the creative aims of the artist and their vision of its meaning, rather than a visual journalistic approach that is often expected in such partnerships, where fact and theory are open to interpretation. For these students and researchers it is their first encounter of interdisciplinary practice, to think out of the box, and to navigate the intellectual and creative challenges required to provide the wider public and non-scientists, a 'story' of innovation and experimental science from the Orchid Research and Development Center and its associated Biotect Industries. Professor Hong-Hwa adds the following:

"The Techo Art Group led by Prof. Eleanor Gates-Stuart has profoundly widened our sense/experience of orchid beauty. The imaginative expression of the orchid beauty via various ways that include virtual reality, music, game, etc., have brought the beauty of the orchid to the public and made it possible for them to feel, listen, and to experience". This is wonderful and intangible for us, as scientists, working in the lab and to have this type of creative artwork from researching the orchids".

Please visit *Mazoo* and explore the spaces: Orlab; Exhibition Room; Library; Game Room, Professor Room and Guide Room (Gateway to ORDC). Feel free to read more about the artists, contact us and check out the link to ORDC.

Orchid Research and Development Center

Established in November 2009 at the National Cheng Kung University, the Orchid Research and Development Center (ORDC) is based in the Department of Life Sciences, under the direction of Distinguished Professor Hong-Hwa Chen. The core mission of the ORDC is to forge industry, academic and research cooperation, to promote long term orchid related research and industry cooperation and problem solving. In addition, the ORDC focuses on development and promotion of key technologies, with the rising competition of Phalaenopsis production of the Taiwan orchid industry in the global economy.

Mission:

- *To establish a platform to facilitate the international cooperation and exposure for orchid research.*
- *To industrialise the results of the Phalaenopsis orchids biotechnology research team.*
- *To integrate strengths among industry, government and academic sectors, and assist Phalaenopsis orchid production industry in problem solving to maintain competitive advantage.*

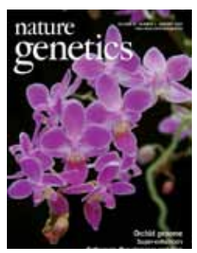
Activity:

Genomics

- *Whole Genome sequencing*
- *Transciptomics*
- *Functional genomics*

Molecular Biology

- *Floral morphology*
- *Flower colour*
- *Flower scent*



Gernomics research

Whole Genome sequencing of P. equestris provides fundamental knowledge for further research in orchid biology (2015).

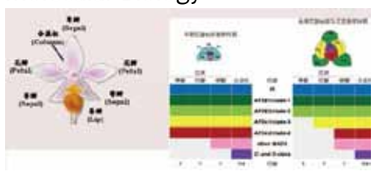
The orchid database, OrchidBase (2011).

OrchidBase2.0 newly added floral non-redundant transcribed sequences from all five subfamilies of Orchidaceae (2013)

ORDC Website

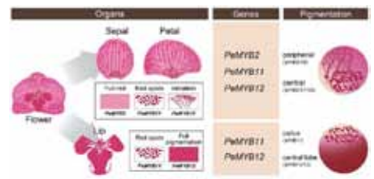
http://orchid.rsh.ncku.edu.tw/bin/home.php

Molecular Biology



Floral morphology

Floral colour



Floral scent

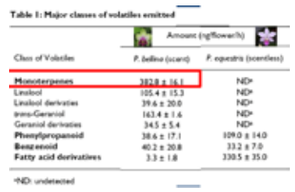
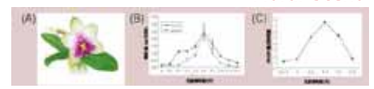


Table 1: Major classes of volatiles emitted

Class of Volatiles	Amount (ng/flower/h) P. bellina (scent)	P. equestris (scentless)
Monoterpenes	382.8 ± 16.1	ND*
Linalool	105.4 ± 15.3	ND*
Linalool derivatives	39.6 ± 20.0	ND*
trans-Geraniol	163.4 ± 1.6	ND*
Geraniol derivatives	34.5 ± 5.4	ND*
Phenylpropanoid	38.6 ± 17.1	109.0 ± 14.0
Benzenoid	40.2 ± 20.8	33.2 ± 7.0
Fatty acid derivatives	3.3 ± 1.8	330.5 ± 35.0

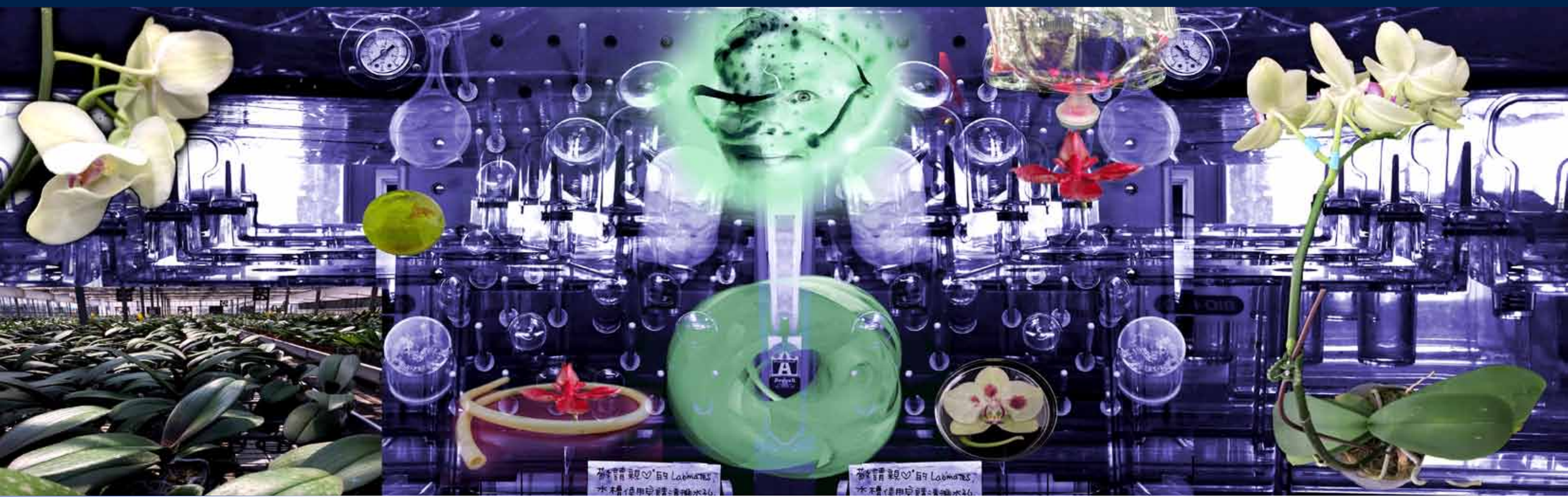
*ND: undetected

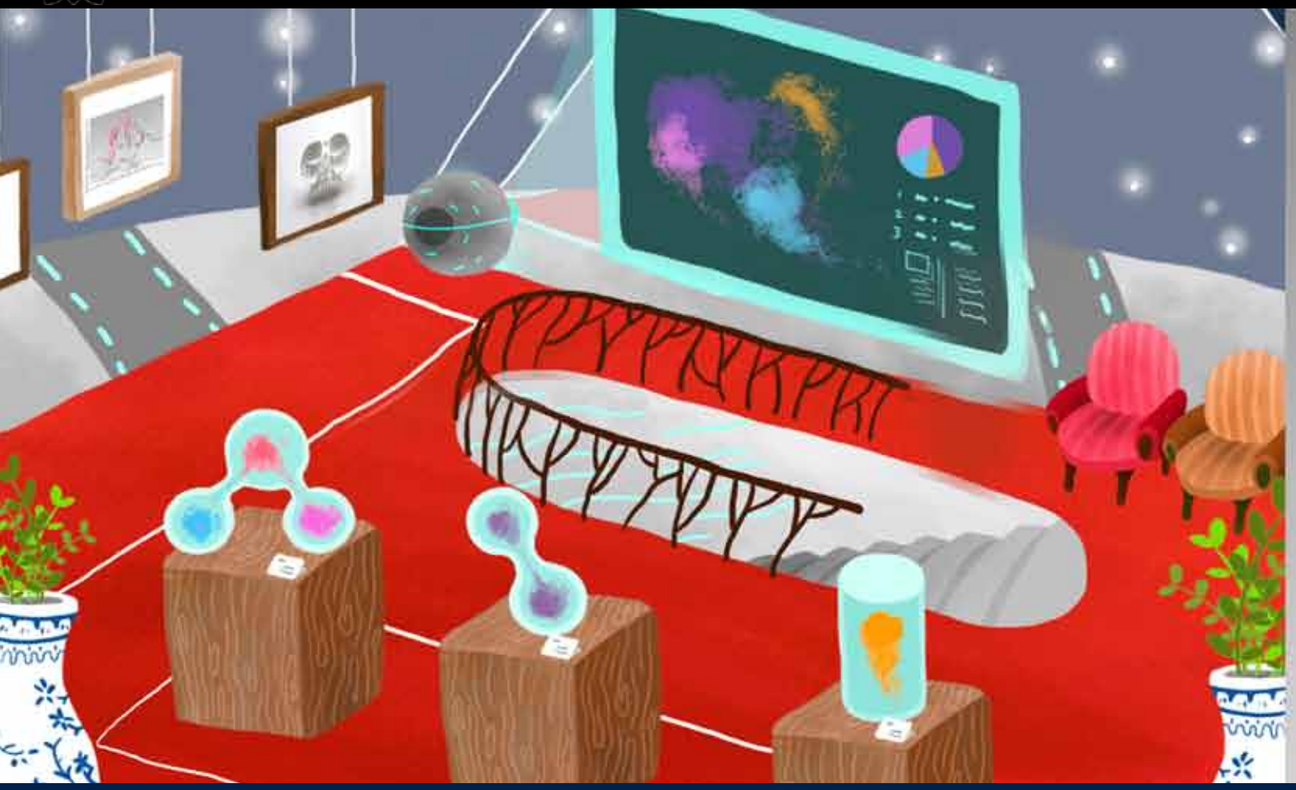


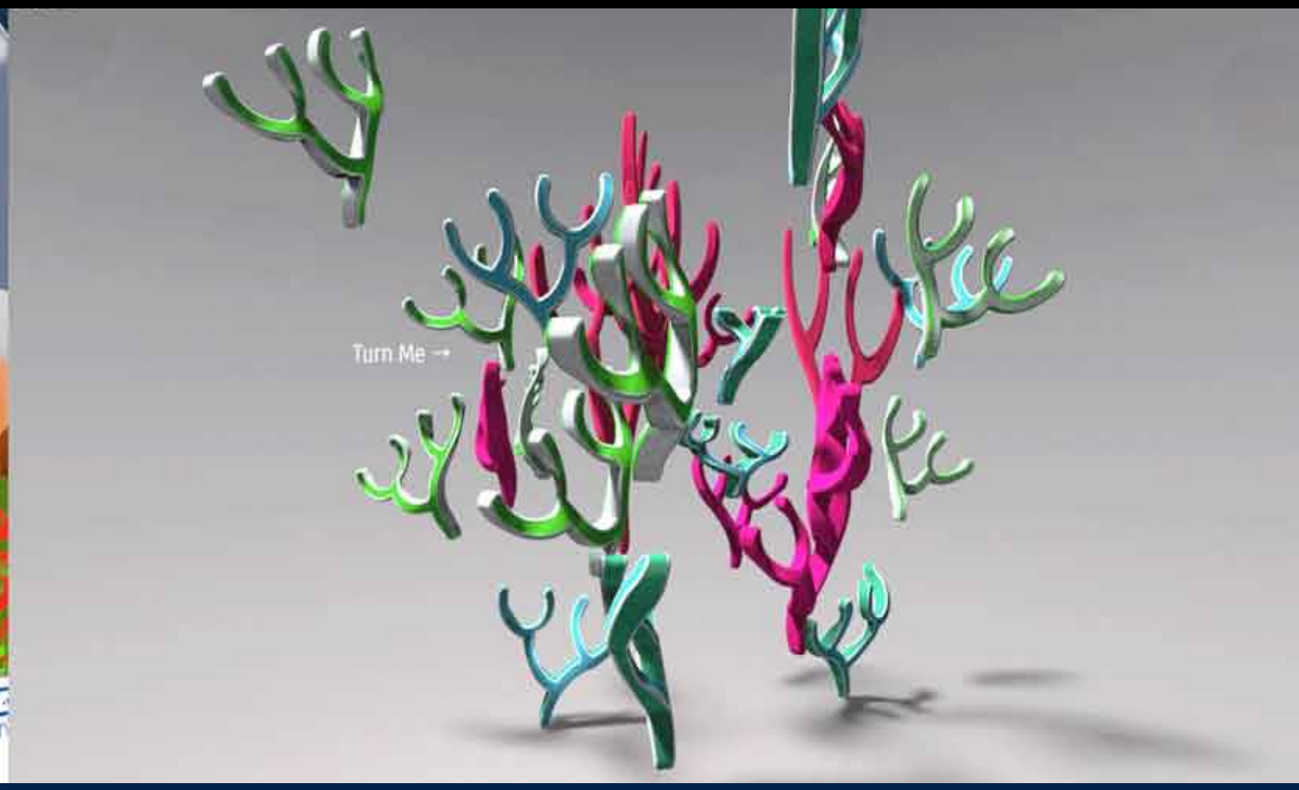
(A) One of fragrant orchids-Phalenopsis bellina. (B)The emission amount of Linalool and trans-Geraniol from the first blooming day (Dd) to the fourteenth (D+14) of Phalenopsis bellina. (C)The gene expression pattern of PbGDPS at different flower development stages of Phalenopsis bellina.

Professor's Room

Meet the Professor..... there is a whole lot of experimentation happening here. Leading the Techno Art crew in the journey of *Anything but Ordinary* as Mazoo embarks on its collaboration with ORDC and the life of the Orchids. Prof. Eleanor specializes in science+art working on her bioart project with ORDC.

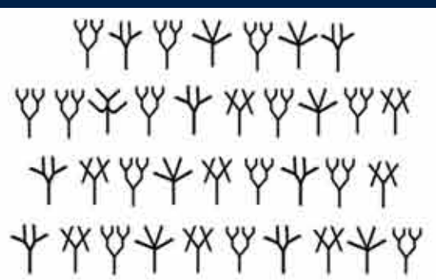


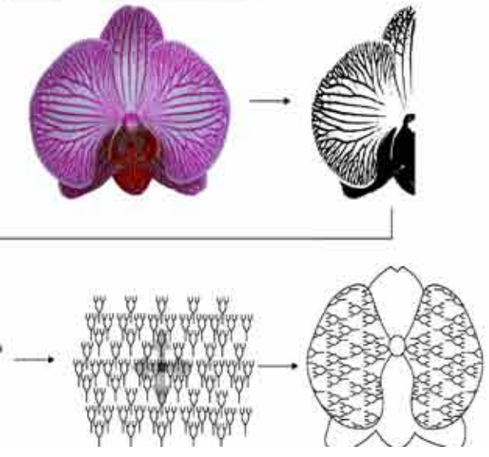


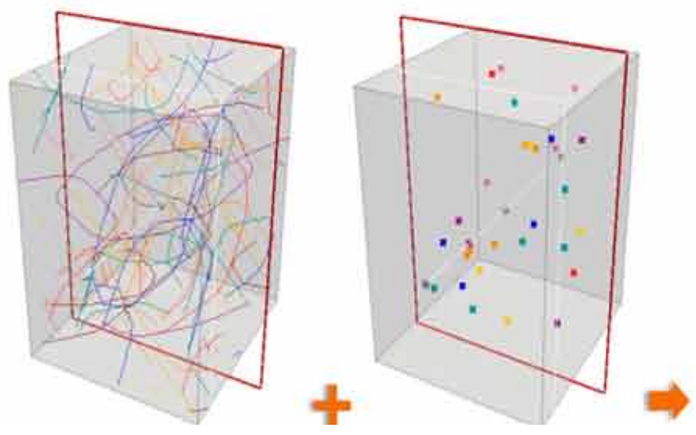


Exhibition Room

Mazoo's Exhibition - Gallery Room showcasing Xin-Hung Lu's (Ace) 3D sculptured Orchid patterns. True to his design practice, Ace, transforms his research of Orchid textures and pattern sequences to create a unique and beautiful orchid. The result is shown on Mazoo where you can rotate the poetic structures.





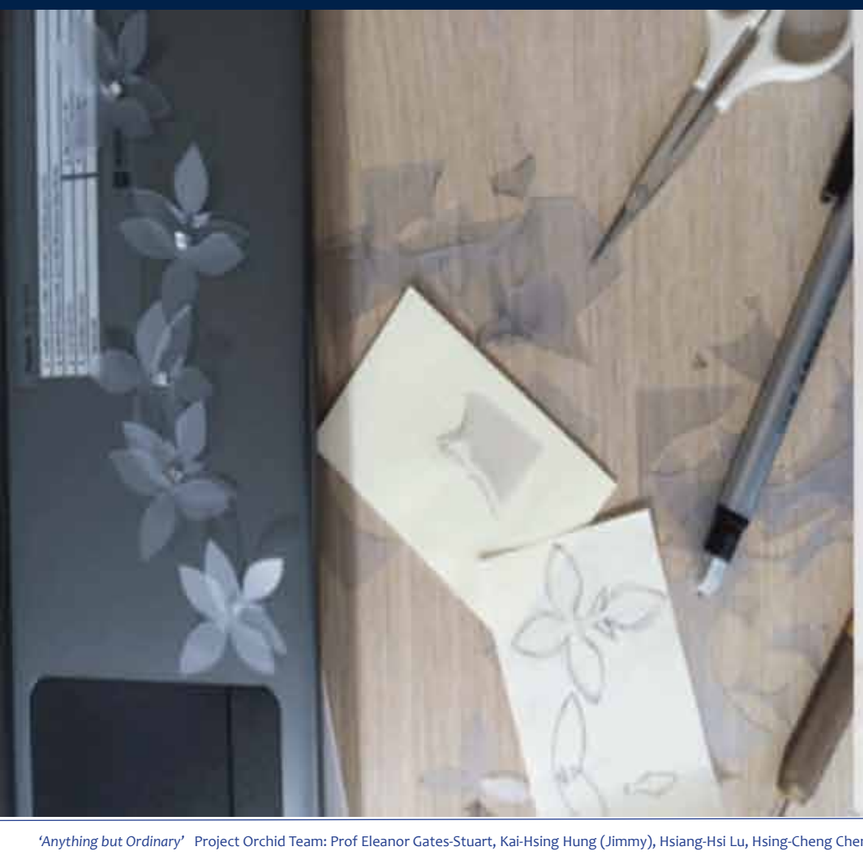


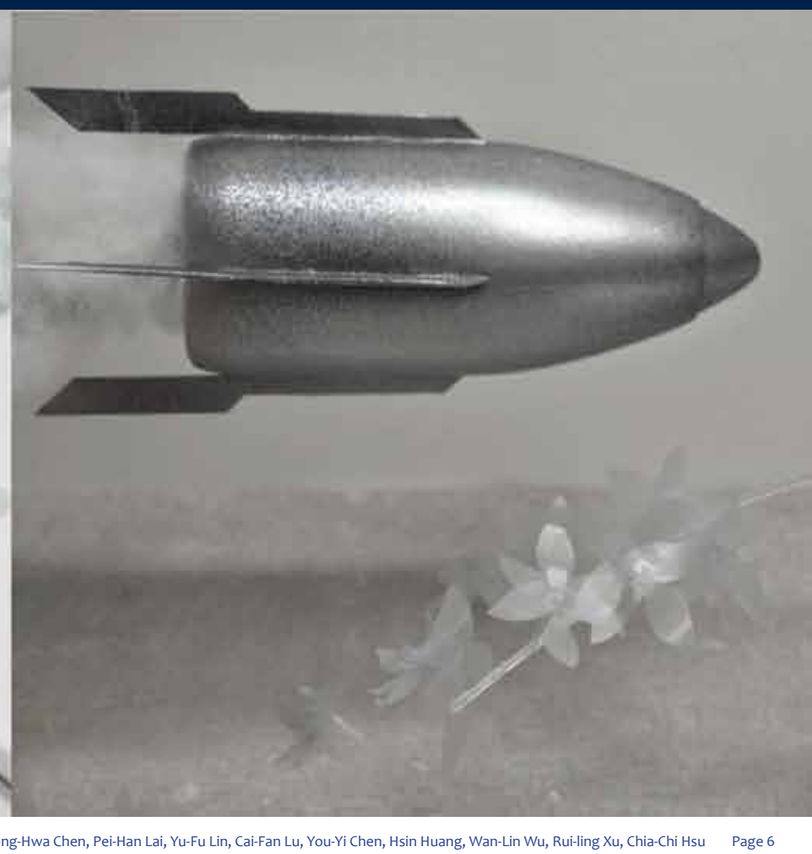
Exhibition Room

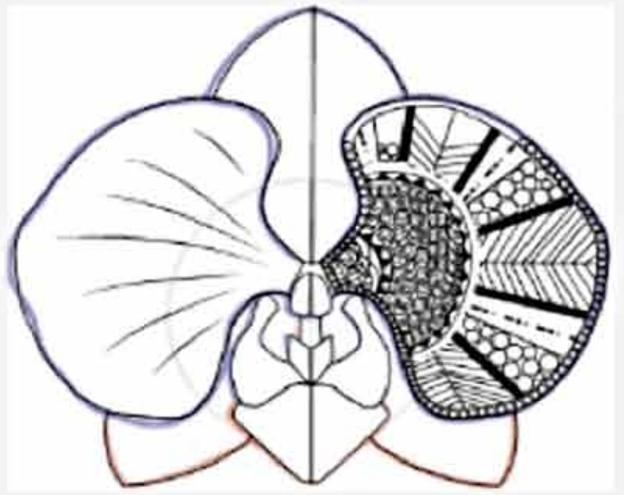
Mazoo's Exhibition - Gallery Room showcasing Wei-Yu Lu's video illustrating the floral scent of Orchids. A bold task visualizing the 'invisible', especially when it depends on experiencing the fragrance for yourself. Based on the molecular biology, Wei-Yu generated a code to show the fragrance through his video.

Mazoo Library

Sharing knowledge, inspired by the history and survival of the native orchid species, *Phalaenopsis Equestris*, Hsiang-Hsi Chen takes us on a photographic journey through the four eras: Before 20th Century; Japanese Colonial Period; National Government Period and Recent Years. Handcrafted, composed and beautifully detailed.







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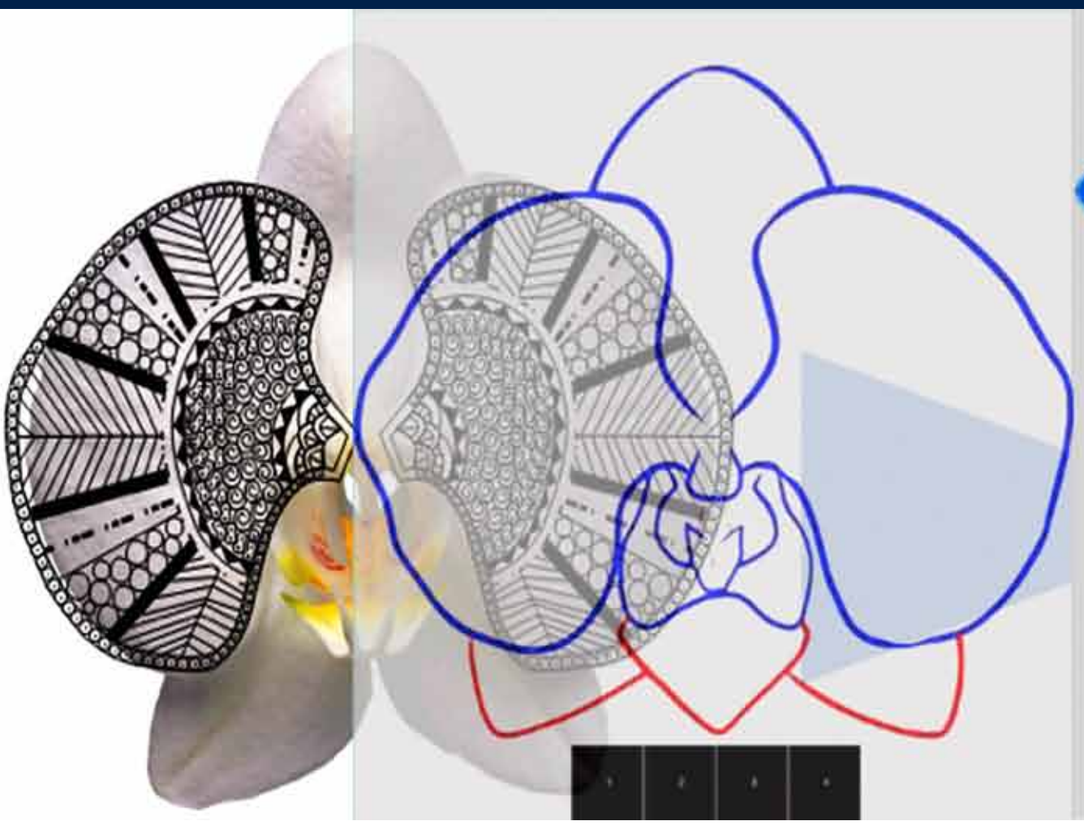
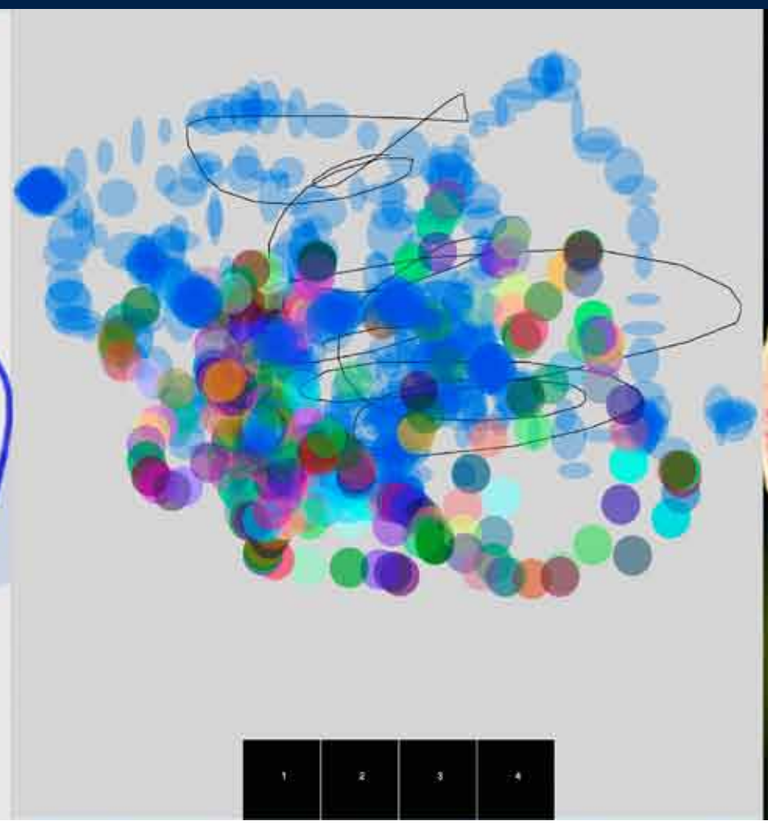
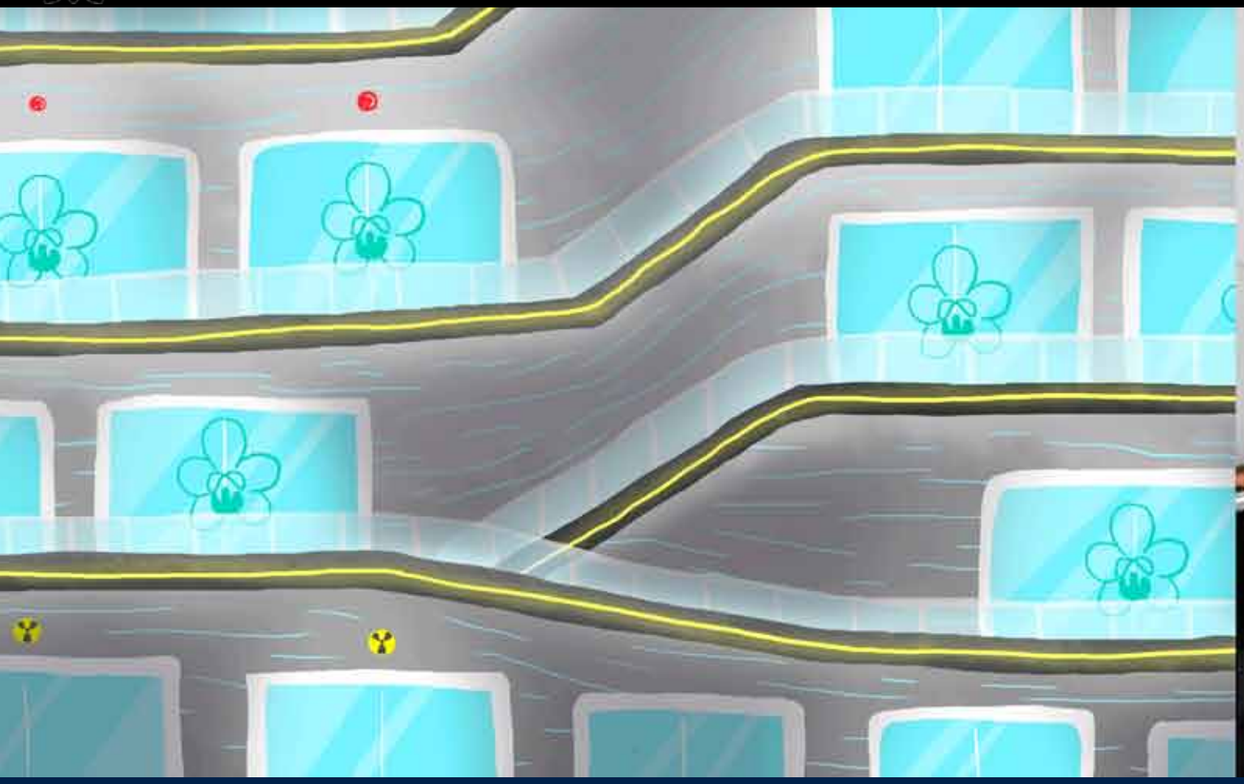
Games Room

A different type of experimentation, a chance to test your creative skills and make your own Orchid pattern. Jiun-Kai Huang's drawing tool and insect game follow his research on the orchid flower stucture, insects and pollination. Ultimately his aim would be to beam Orchids around the planet - meanwhile via Mazoo online.

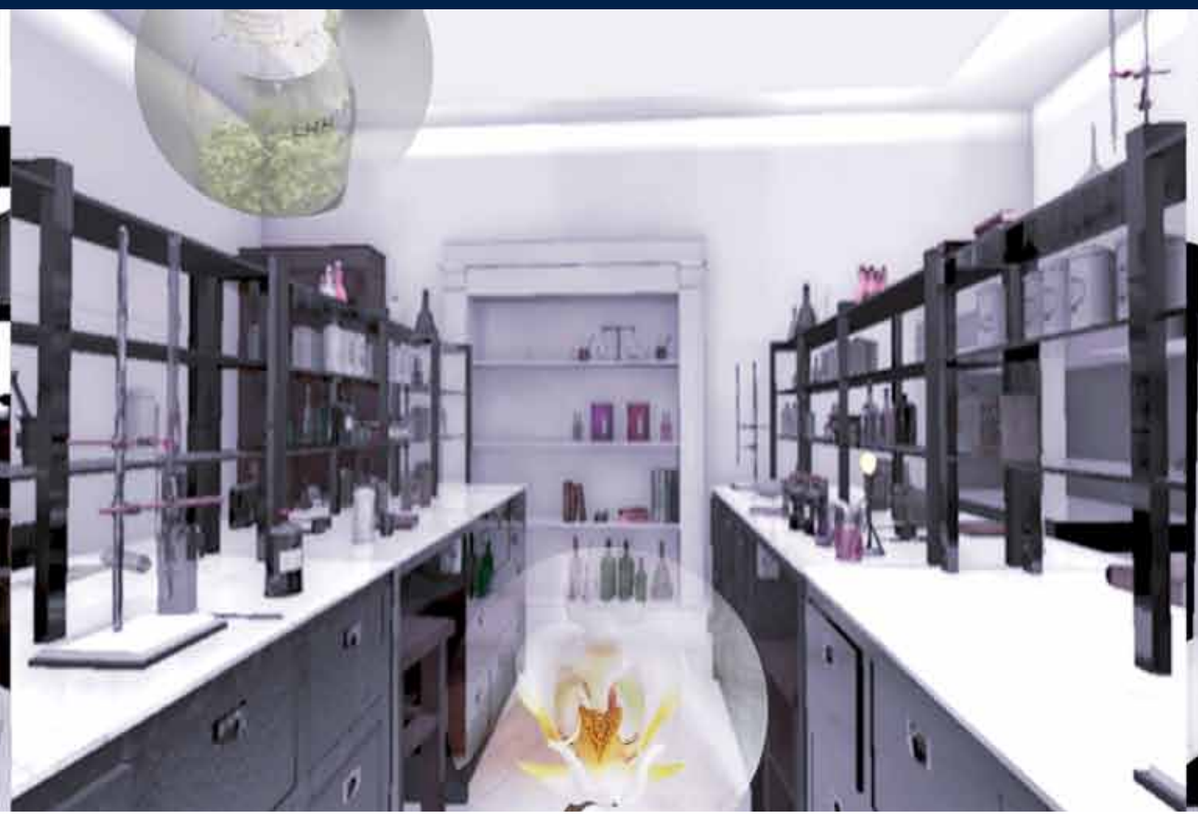


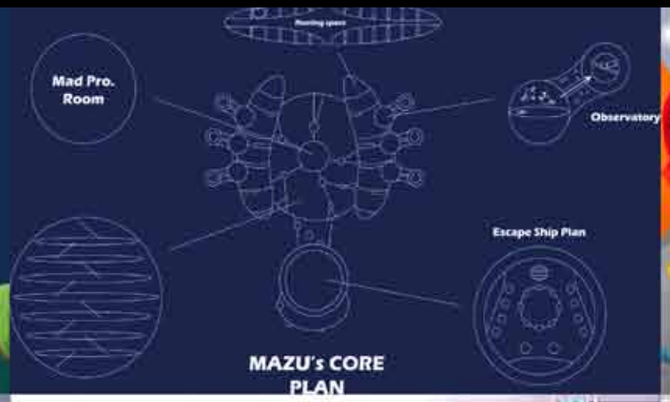


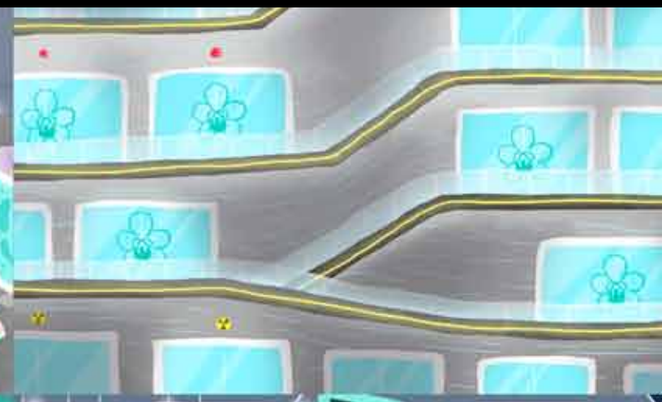


OrLab

So what does our science lab look like ... take a look inside our *OrLab* via Hsing-Cheng Chen's (Rider) detailed construction based on his lab' visit to Southern Taiwan Science Park. This virtual tour includes the following equipment build: 1. a laminar flow, 2. a mortar, 3. a vortex mixer, 4. the lab space.

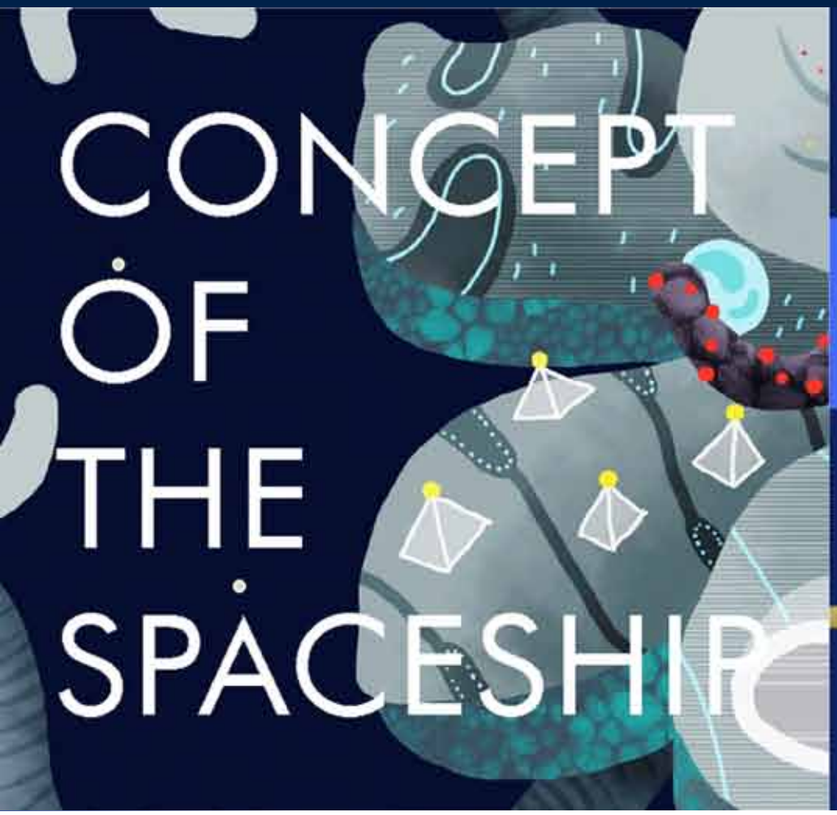


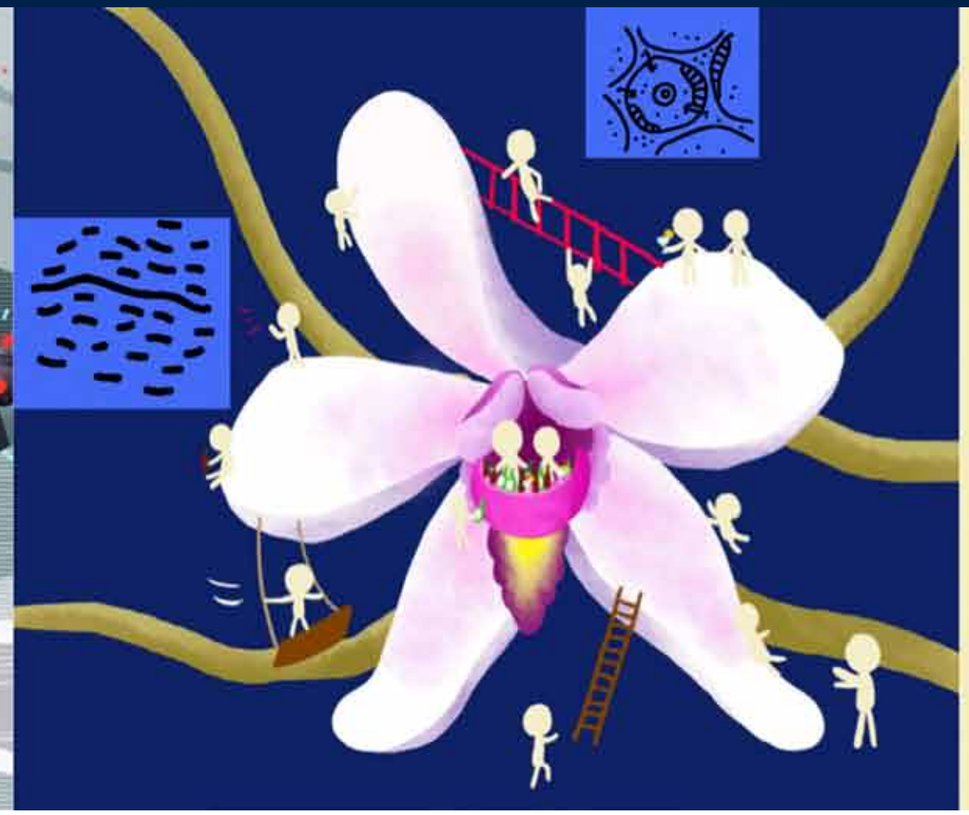




Mazoo Illustrated

The challenge of visualizing *Mazoo.Space* is captured by Kai-Hsing Hung (Jimmy) in his series of wonderful drawings of the Mazoo mythological science-art spaceship laboratory and its associated spaces. His attention to scientific detail is subtle at first glance but, nevertheless, informed and beautifully integrated.





Mazoo Music

You will need to visit Mazoo to listern to Yin-Shou Chen's (Jessica) music compositions for all the various Mazoo rooms and lab's. Using her sound recordings from ORDC and field visits, Yin-Shou worked with each artist to create an individual 'sound' in relation to their scientific focus and that related to the Orchid research.

Contact

Orchid Team

Professor Eleanor Gates-Stuart

Professor Eleanor Gates-Stuart has a unique profile particularly in research relating to the sciences, technology and art, working with major research organisations, museums, education, business and government.
Recently completed her Professorship (Full) in Technology and Art (Techno Art) at NCKU and is Visiting Research Fellow at the Australian National Centre for the Public Awareness of Science (Australian National University), specialising in science and arts. She was awarded the 2016 Scitech Innovation Art, scienceart commission 'Under the Surface', supported by Rio Tinto Innovation Central, WA.
Her scope of creativity and production is extensive, constantly questioning and engaging the audience in new and innovative ways through her artistic practice. Works include: interactive exhibits, content development, application of innovative materials, design, print, publication and film works.
www.eleanorgatestuart.com

Xin-Hung Lin (Ace)

Ace, is an art designer, specializing in product design, visual design, cultural creativity, art engineering, and patents. His research is focused on texture and re-design principles that will be applied to the lines and colour in the orchids.
His plan focuses on the texture of the orchid surface and attempts to rethink it with a design approach. The project is divided into three parts,

1. 2D visual design approach to re-texture re-applied to 3D.
2. Construct a 3D representation of the 3D axial model.
3. Construct the rhythm of the music with the ups and downs of the coordinate position in 3D axial direction.

Wei-Yu Lu

Wei-Yu Lu graduated from National Chung Cheng University, majoring in mass-communication, minoring in politics. Now studying in Techno-art at NCKU. In this project combining programming with photography and film, to show the invisible chemical composition of orchid molecules.
Fragrance substances of orchid are very small, the naked eye can not see them. His design concept is to visualize the various properties of the information. He set up different scents then gave them different colors, for example, excited for red, optimism for orange, confident for yellow, gloomy mood for blue, etc. However, his classmates and his ORCD research partners coincidentally asked him the question, "did you decide the colours based on Color Science or Color Psychology?".
The questioing lead him to change his concept.

Jiun-Kai Huang

Jiun-Kai Huang, graduated from Shih Chien University. Currently studying at NCKU for an arts and technology degree course, specializing in graphic design, graphic photography, APP-UI design.
His aim is to connect Orchids to technology. At first, he manufactured a future Orchid, because Orchid is a subject created by humans, half of the orchid is in the present and half in the future. He wishes the Orchid can present our idea under the advanced technology and another initial idea (The Orchid drawing board). His idea is to let everyone draw their own Orchid and project it on real Orchid to achieve the user's drawn image. Interested in the bees attraction to the Orchid and pollination, he created bees in the game so that children will be able to understand the orchids easily. When the game begins, the bees will start flying. To win the games, users click on a certain number of bees in a limited time. The purpose of the game is to have fun with orchids.

Hsiang-Hsi Lu

Hsiang-Hsi Lu is a product designer and fashion photographer, enjoying making interesting and beautiful objects. His project research is 'The story of Phalaenopsis Equestris'.

The main purpose of the Orchid Project is to present the knowledge (especially in the area of technology) in an artistic way. His personal work is using photography to present a native orchid species, from the historical timeline: how it grew in its mother land without human activity, how it was found, and its survival today. The result is four photographs which contain this research information. The story of the Phalaenopsis Equestris is a native species from Jimagod Island, Taiwan, which is recently endangered. Not only is it important to orchid hybridization, but the story behind it is equally important. Hsiang-Hsi is the photographer and director for the Orchid Team portrait photographs.

Hsing-Cheng Chen (Rider)

Graduated from the Department of Mathematics, National Central University.

Currently Studying for a Masters degree at National Cheng Kung University, the Techno Art Program.

He specializes in interactive multimedia design, animation, video production and story boards.

He is in charge of the Mazoo website, technical engineering and maintenance. OrLab, the virtual lab is a simulated environment where people can realize what scientists do in an Orchid lab and know what it could look like. By letting people having an interactive experience in the OrLab, he has provided a virtual environment that looks like a real orchid lab. He has illustrated a selection of instruments from the science lab to achieve this goal.

Kai-Hsing Hung (Jimmy)

Graduated from National Chung Hsiang University, majoring in landscape and recreation.

In the Mazoo website all designs are based on the research of Orchids and the collaboration with NCKU's Orchid Research and Development Center. For example, the tentacle of Mazoo is developed from the root of an orchid. The arrangement of the book shelfves in the library are based on the cross section of orchid petals. The appearance of the Mazoo spaceship is based on the Orchid shape. Each petal represents one room. They are covered with giant transparent domes. Some natural landscape will allow people to breathe fresh air in the middle of the space. The Library provides more knowledge about the history and culture of orchids.

Guide room is the place that links to the research of Orchid Center. OrLab can be linked to a virtual lab for people to visit with VR technique.

Yin-Shou Chen (Jessica)

Yin-Shou Chen is dedicated to the combination of music composition and technology. She is in charge of music and sound effects in Mazoo. There are six rooms in the spaceship. The Home Page and the Professor Room use cello sounds to increase tension. There are background sounds for the whole of the spaceship.

The cello is played by Wei-Shou Chen. Yin-Shou wanted the very low tension and weird sound, which needs to be played by giving the bow a lot of pressure. Wei-Shou played the sound with two hands.

The background sound: C-C-bB—G————

This simple melody is like the shape of an Orchid's petal.

The Game Room: has a lot of percussion to make the music lively. The Exhibition Room uses drawing to create music with tension and related to the science work. OrLab uses recordings from lab and the Library uses open book sounds.

Professor Hong-Hwa Chen

Professor Hong-Hwa Chen has engaged in Orchid basic research for the past two decades. She has been to France, United States, South Korea and mainland China for short-term study visits several times. So far, she has published 57 academic journal articles with high impact factors with 3,060 citations. In addition, she has published 114 symposium abstracts/articles, edited three special books, 14 book chapters, eight domestic and foreign patents, and two technology transfers. Her research has accumulated enough research energy to have outstanding contributions on the subsequent orchid research.

For her academic excellence, she has been appointed as a Distinguished Professor at National Cheng Kung University (NCKU) three times from 2007--2010, 2012--2015 and 2016--2019 school years respectively. She founded 'Orchid Biotechnology Industry-University Alliance' and 'Orchid Research and Development Center' at NCKU.

Field Trip: Orchid Research and Development Center