

The Revisiting Shoji Yoh exhibition celebrates the launch of the online Shoji Yoh Archive and draws from it to trace a trajectory of experimental design practice across five buildings completed between 1979 to 1994. The exhibition showcases Yoh's work through archival architectural drawings and photographs as well as new 3D scanned animations and digitally fabricated parametric architectural models.

# REVISITING SHOJI YOH

CATALOGUE

EXHIBITION 30 NOV 2021 - 02 FEB 2022

## FUNDED BY



## PROJECT PARTNERS



## PRESENTING PARTNER



## Revisiting Shoei Yoh Exhibition Catalogue

### Project Events Venue and Presenting Partner:

Australian Design Centre  
101/113-115 William Street, Darlinghurst, Sydney, Australia

### Exhibition:

November 30th to January 25th 2022

### Website Launch and Symposium\*:

Thursday December 2nd 2021, 4pm-8pm

\*In-person & online

### Website

shoeiyoh.com



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Publication Manager: Nicole Gardner

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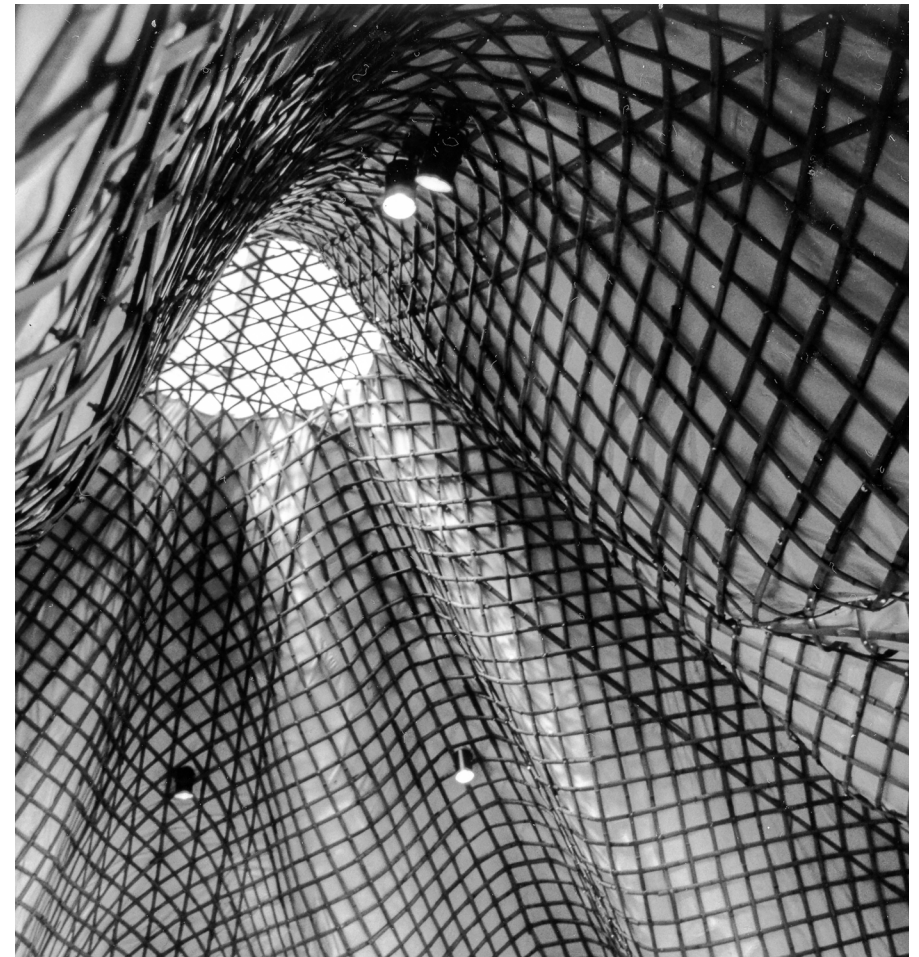
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Interior of the Naiju Community Centre, Fukuoka, Japan.

Photograph © Yoh Design Office

# REVISITING SHOEI YOH

The Japanese architect Shoei Yoh is an internationally recognised figure of late 20th century architecture and a pioneer of digital design.

In 2019 Yoh deposited his architectural office archive including drawings, digital model files, photographs, project notes, architectural magazines, and physical models with the Faculty of Design at Kyushu University, Fukuoka, Japan.

Since then, a research team from Kyushu University and the University of New South Wales (UNSW), Sydney have collaborated to digitise archival assets, 3D scan living buildings, and design and populate a new and immersive online Shoei Yoh Archive.



Exterior view of the Kinoshita Clinic, completed in 1979.  
Photograph © Yoshio Shiratori

This exhibition celebrates the launch of the online Shoei Yoh Archive and draws from it to trace a trajectory of experimental design practice across 5 buildings completed between 1979 to 1994. This begins with the Kinoshita Clinic in Fukuoka, Japan (1979) that reflects Yoh's early interest in material technology.

The Music Atelier (1986), Oguni Bus Terminal (1986), and Oguni Dome (1988) tell the story of Yoh's significant contribution to the modernisation of timber architecture in Japan during the 1980s.

The Naiju Community Centre (1994) represents Yoh's most radical architectural endeavour, bringing together locally grown bamboo, hand weaving construction techniques, and advanced computer analysis to realise a complex geometric form in bamboo and concrete.



# WHO IS SHOEI YOH?

Written by Masaaki Iwamoto

Assistant Professor, Faculty of Design, Kyushu University, Japan

Shoei Yoh was born in Kumamoto, Japan in 1940. After graduating from Keio University in 1962 with a degree in economics, Yoh went to the United States of America (USA) to study fine and applied arts at Wittenberg University, Springfield, Ohio. Returning to Japan in 1964, Yoh worked as an interior designer at International Design Associates in Tokyo, where he was involved in such projects as Readers Digest Office in Tokyo. He then moved to Fukuoka, where he worked as a designer for NIC, contributing to the rise of Fukuoka's design culture.

In 1970, Yoh established the Yoh Design Office in Fukuoka and began working across product design, interior design, and architectural design. His works include Ingot (1977), the first building in Japan to use four-sided structural

glazing, and Kinoshita Clinic (1979), a boldly shaped building with fibre-reinforced polymer (FRP) molded panels, both of which combine new technology with poetic space. His serial works on the theme of light, such as the House of Light Lattice (1981), have been highly acclaimed both in Japan and abroad.

In 1984, he began work on projects in the town of Oguni, Kumamoto. His series of timber three-dimensional truss buildings, developed through the Music Atelier (1986), U Station (1986), and Oguni Dome (1988), became a milestone in the modernization of timber architecture in Japan.

In the 1990s, he pursued architecture as a natural phenomenon, producing works such as Galaxy Toyama (1992)



Shoei Yoh on site during the construction of the Oguni Dome in the Kumamoto Prefecture, Japan.  
Photograph courtesy of the Shoei Yoh Archive, Kyushu University, Japan.

and Naiju Community Center (1994). These works, which incorporated computer analysis into the design process, are regarded as pioneering works in digital design.

Yoh's architectural and design works have received numerous accolades including Japan Interior Designer Award, 1979; Japan Architectural Association Award for Stainless-Steel House with Light Lattice, 1980; Mainichi Design Award, 1983; Architectural Institute of Japan Award for the series of timber buildings in Oguni, 1989; IAKS Award, Gold Medal, 1993. Yoh was awarded an Honorary Doctorate in Fine Arts from Wittenberg University in 2007.

Shoei Yoh has served as a visiting lecturer at Kyushu University from

1992 to 2002, and as a Professor at the Graduate School of Media and Governance, Keio University from 1996 to 2005. In 1992, Yoh was a Visiting Professor at the Graduate School of Architecture, Planning and Preservation at Columbia University.

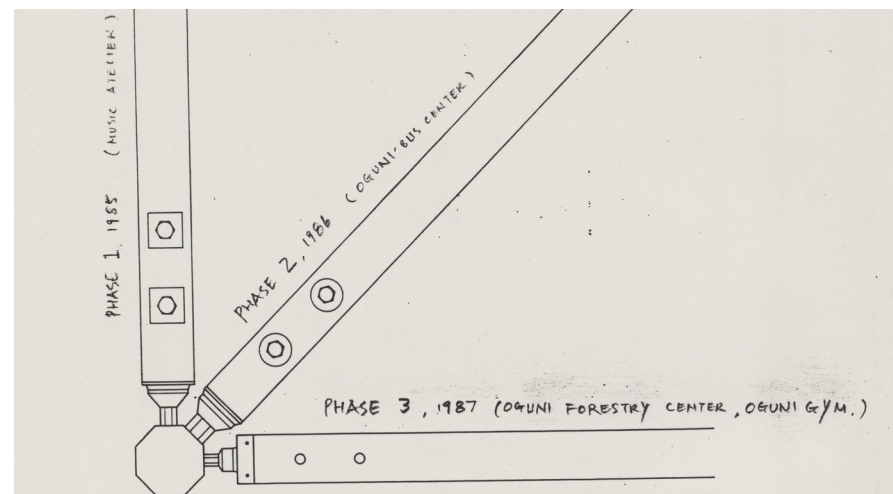
A large collection of drawings, models, products, and materials of Shoei Yoh and the Yoh Design Office are currently held at the Shoei Yoh Archives at the Environmental Design Global Hub, Kyushu University. Smaller collections of work by Shoei Yoh and the Yoh Design Office archive are held at the FRAC Centre (Orléans, France), Canadian Centre for Architecture (Montréal, Canada); and the National Museum of Art (Osaka, Japan).



# SHOEI YOH ARCHIVE

The online Shoei Yoh Archive contains a repository of newly digitised assets from Shoei Yoh's architectural office including drawings, digital model files, photographs, project notes, architectural magazines, and physical models.

Populating the Shoei Yoh Archive is an ongoing project. The site currently hosts archival material related to six projects designed by Yoh and completed between 1979 to 1994 as well as LiDAR scan data of selected examples of Yoh's built work. In addition to a standard repository of searchable and downloadable digitised assets the site presents archival material in an exhibition format in a 3D spatial environment, referred to herein as a Spatial Archive.



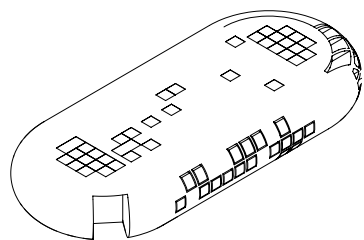
Connection details to steel globe joint by German company MERO  
Drawing courtesy of the Shoei Yoh Archive, Kyushu University, Japan.



Interior view of the online 3D Spatial Archive  
Image courtesy of Daniel Yu

# KINOSHITA CLINIC

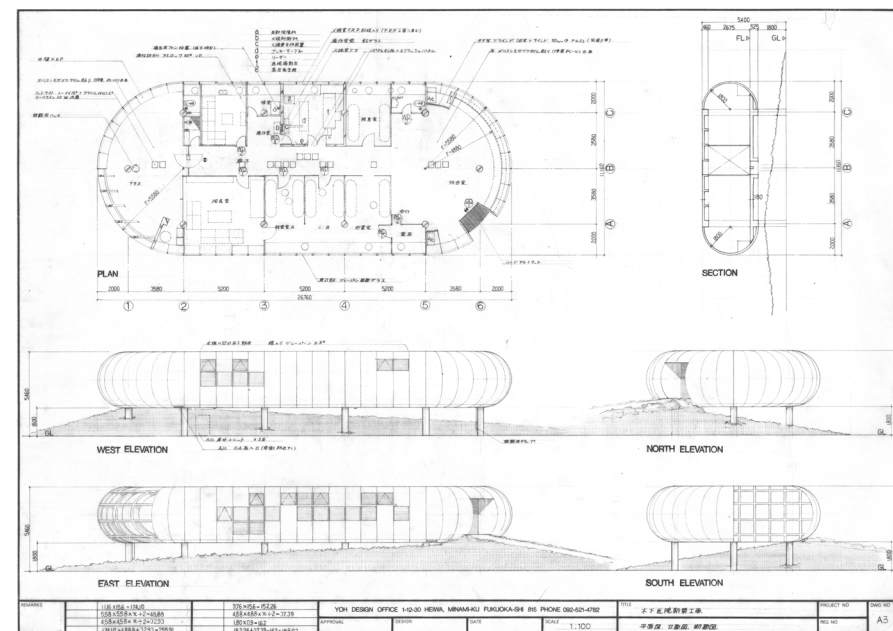
木下クリニック



The Kinoshita Clinic in Fukuoka, Japan was completed in 1979 and is an early example of Yoh's exploration of the interrelationships between building, ground, and the forces of nature.

The aerodynamically shaped building appears to levitate suggesting its temporary arrival or impermanence on the site as well as counterforce to the environment and to gravity.

Significantly, the building reflects Yoh's interest in material technology. The boldly shaped building is finished in fibre-reinforced polymer (FRP) moulded panels, a material not widely used for architectural applications at the time.



Plan and elevation documentation drawings of the Kinoshita Clinic, Fukuoka, Japan  
Drawing courtesy of the Shoei Yoh Archive Kyushu University, Japan.

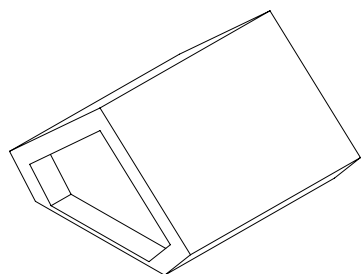


Interior view of the Kinoshita Clinic, Fukuoka, Japan.  
Photograph © Yoshio Shiratori

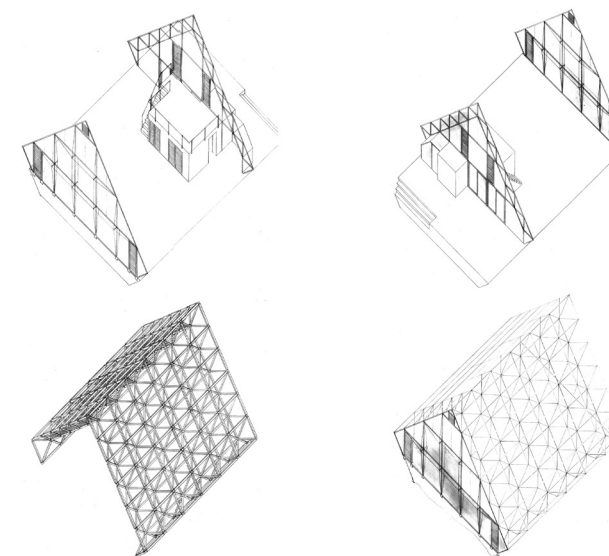


# MUSIC ATELIER

ミュージック アトリエ



Completed in 1986, the Music Atelier is in the Aso district of the Kumamoto Prefecture, Japan. It was designed by Yoh in parallel with the design for the nearby large open-air concert arena in Minami-Aso known as ASPECTA (which combines a reference to Aso and the term 'spectacle'). Significantly, the Music Atelier was the first in a series of buildings by Yoh that investigated the design and performance of a three-dimensional timber truss structure using the trimmings of locally grown cedar called *yabukuguri*, otherwise described as 'thinned timber'. The Music Atelier was the first three-dimensional timber truss structure using thinned timber and epoxy resin adhesive in the joints to be accredited under Article 38 of the Japanese Building Standards Act.



Axonometric drawing of Music Atelier, Kumamoto, Japan.  
Drawing courtesy of the Shoei Yoh Archive, Kyushu University, Japan



Interior view of Music Atelier, Kumamoto, Japan.  
Photograph © Masaaki Iwamoto

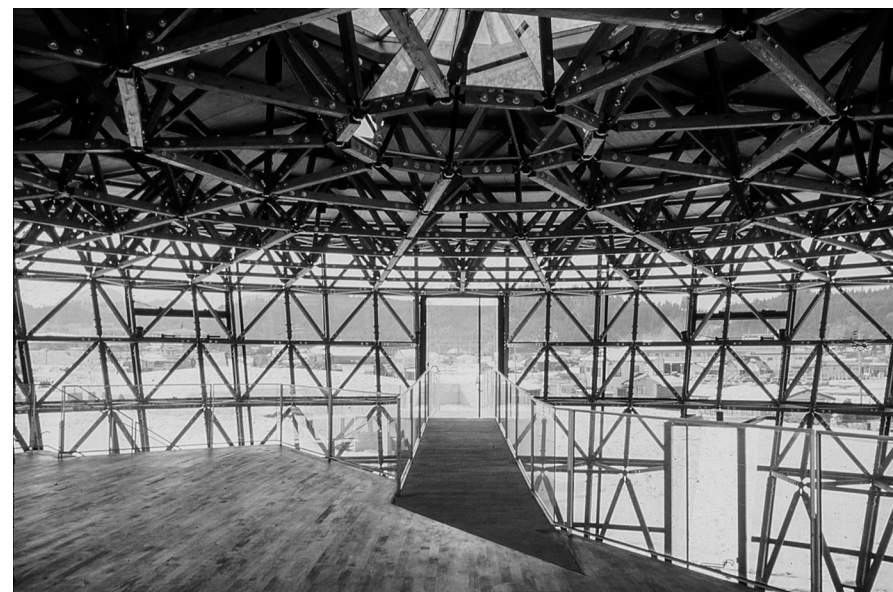


# OGUNI BUS TERMINAL

小国町交通 センター

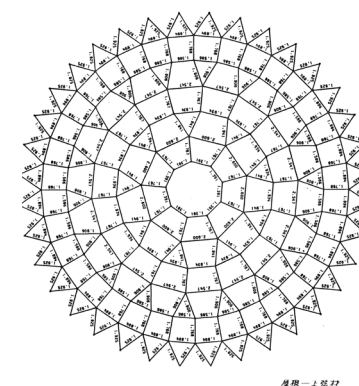
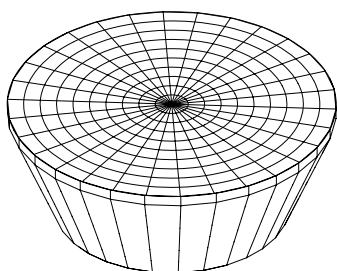
In the early 1980s the Japan National Railway service to Oguni Town in the Kumamoto Prefecture was decommissioned. As a result, funding was given to the town to support a new masterplan for the former train station site that Yoh designed.

Completed in 1986, the Oguni Bus Terminal, was the only building realised from Yoh's masterplan. It explores a circular division of the three-dimensional timber truss structure system initially developed for the Music Atelier. Yoh worked with a range of consultants and academics to identify the structural constraints and opportunities of the truss system and refine the detailing of the bolted junctions that connect to the steel globe joint made by the German company MERO.



Interior view of the Oguni Bus Terminal (U-Station)  
Photograph © Shoei Yoh

Here Yoh engaged computer structural simulation analysis techniques to explore design iterations of the three-dimensional timber truss structure and its structural form and performance.

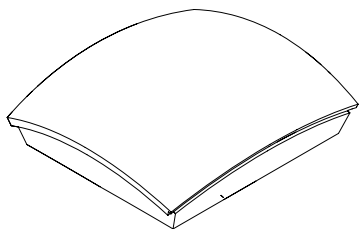


図面—上段下

Structural division plan for the Oguni Bus Terminal  
Drawing courtesy of the Shoei Yoh Archive, Kyushu University, Japan

# OGUNI DOME

小国町民体育館

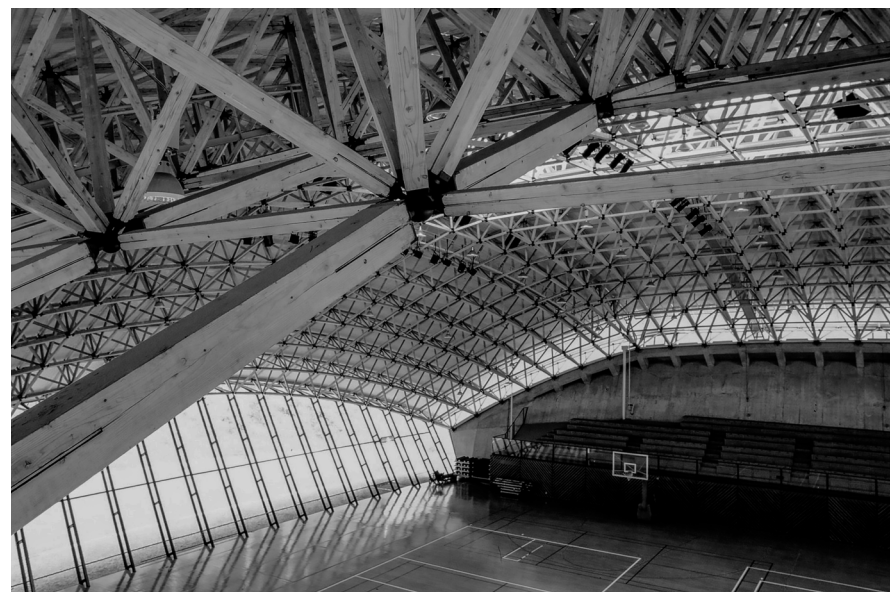


Completed in 1988, the Oguni Dome features a large span, non-standard three-dimensional timber truss structure that innovatively makes use of the region's abundant cedar.

Designing the Oguni Dome as a three-dimensional timber truss system, or large space frame structure, meant Yoh could make use of smaller diameter and shorter timber members.

Yoh was inspired by the *Multihalle* space frame structure in Mannheim, Germany designed by Frei Otto in 1975.

The testing and certification of the three-dimensional timber truss structures used in the Music Atelier and Oguni Bus Terminal buildings



Interior view of the Oguni Dome, Kumamoto, Japan.  
Photograph © Hajime Inoue

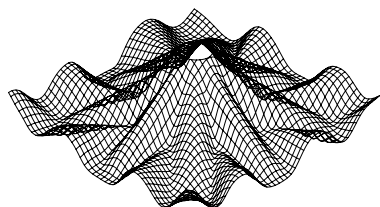
were pivotal to the structural accreditation processes and realisation of the Oguni Dome.

In 1989 Shoei Yoh was awarded the Architectural Institute of Japan Prize for timber projects in the town of Oguni.

In 2019 the Japan Institute of Architects (JIA) awarded the Oguni Dome the Twenty-Five Year Award.

# NAIJU COMMUNITY CENTRE

内住コミュニティ センター



The Naiju Community Centre and Nursery School completed in 1994 in the town of Chikuhō, Fukuoka, reflects Yoh's continued commitment to push material limits.

Here Yoh explored ways to make use of the local material of bamboo. But as bamboo was not a certified building material in Japan, he decided to use bamboo as permanent formwork for the complex three-dimensional concrete shell.

Both origami models and computer simulation analysis were used to explore and develop the design as well as test the structural properties of the complex folded geometry.



Naiju Community Centre under construction in 1994.  
Photograph © Yoh Design Office

The Naiju Community Centre was constructed with the help of the local community. This involved locals and craftsman who handwove the complex bamboo gridded net structure.

Once the woven net was suspended from temporary formwork a fire was safely ignited inside the building to create enough heat to manually bend the bamboo into the desired form.



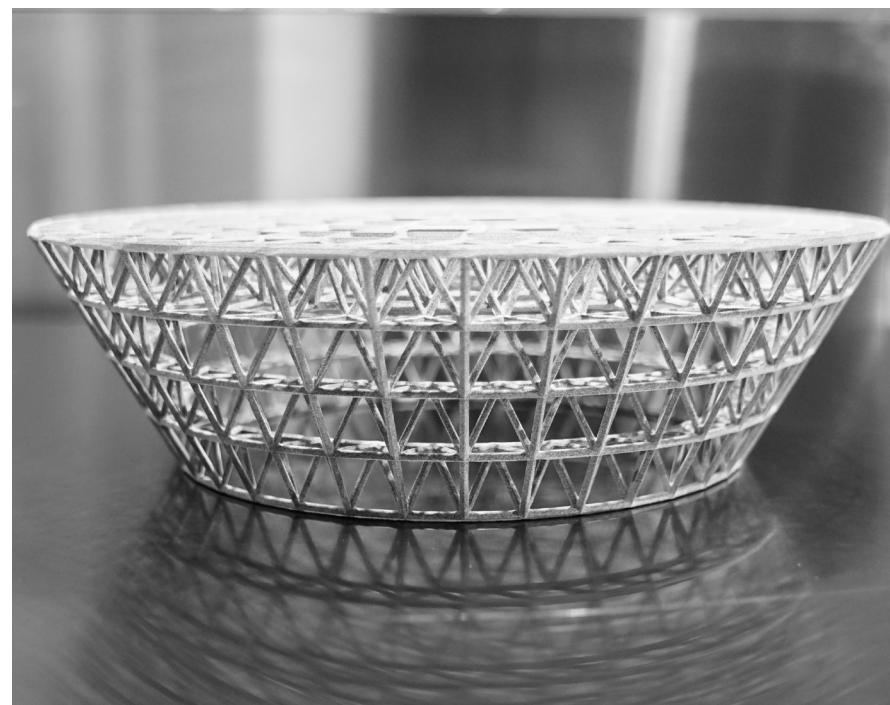
## 3 D P R I N T E D M O D E L S

Many of the original physical models created by Shoei Yoh's team were carefully and meticulously constructed by hand. To reproduce these models for this exhibition the project team have engaged with the contemporary technologies of advanced computational design modelling and 3D digital fabrication machines.

Based on archival documentation drawings, and 3D scan data in the case of Naiju, all models were created in Grasshopper, a parametric visual scripting environment for Rhino 3D modelling software. The shell of the Kinoshita Clinic was generated using curves through a surface grid process, and the openings were cut from subdivided surface projection. The three-dimensional timber truss for Music Atelier was generated

through a surface subdivision process on every outer surface. The three-dimensional timber truss for the Oguni Bus Terminal was generated through a subdivision and linking process where the pattern for division extends from the centre of the building. The three-dimensional truss structure for Oguni Dome was generated through a subdivision and linking process.

The project team investigated innovative methods of digital fabrication. The Dental Clinic model was 3D printed in PLA plastic on a MultiJet printer. A mould of this 3D print was made using silicon. A final model was made using an aluminium casting resin which was hand polished. All other models were 3D printed in nylon powder using fusion jet printing on a HP4200 printer.



3D printed model of the Oguni Bus Terminal (U-Station)  
Photograph © Daniel Yu

## 3 D S C A N N I N G

### 3D Animations of Shoei Yoh Buildings

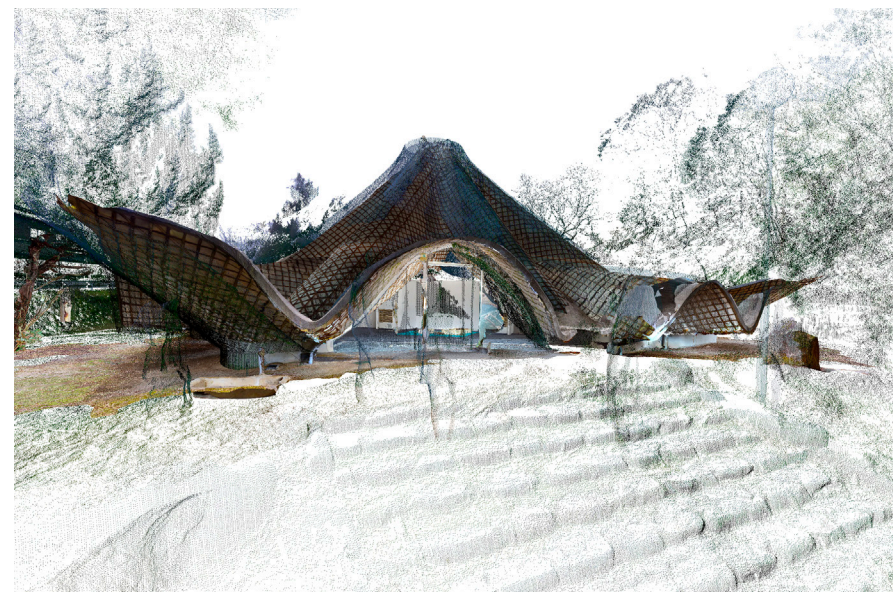
By Jack Barton

This series of animations depict five of Shoei Yoh's living buildings and were developed using LiDAR scanning technology. Just as radar uses radio waves to map spatial patterns, LiDAR uses laser light to plot points in space with their corresponding colours.

The resulting three-dimensional environments can be used for documentation, measurement, analysis, exploration and communication of quantitative and qualitative spatial characteristics.

Of the five scanned buildings, some are active, some repurposed and some abandoned at the time of scanning. Glitches, rogue laser points, interior

furnishings and fleeting captures of people were deliberately retained during processing. These animations convey not only a surveyed point-of-truth in time, but the living qualities of each place.



3D LiDAR Scan Animation of Naiju Community Centre  
Image © Jack Barton

### Interpretative Sonifications of Shoei Yoh Buildings

By Sofie Loizou

The soundtrack to the Animated 3D Scans of Shoei Yoh Buildings includes sonifications that use layering, movement, texture and dynamics to explore the detailed structures from an auditory perspective. The works are primarily built from traditional Japanese instruments Shamisen, Koto, Temple Gong, and Shakuhachi, combined with environmental recordings. These sounds are processed using granular sampling, time stretching techniques and spatial ambience emulation. The compositions follow the first-person perspective, navigating and interpreting the structures into sounds as we fly through contours of the architecture.

The Shoei Yoh Archive project team undertook 3D scanning of Shoei Yoh's living buildings between 2019-2020.

## FUNDED BY



## ACKNOWLEDGEMENTS

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**Shoei Yoh Archive Project Team:**

**UNSW:** Dr Nicole Gardner | Associate Professor M Hank Haeusler | Dr Kate Dunn | Dr Jack Barton | Tracy Huang | Daniel Yu |

**Kyushu University:** Assistant Professor Maasaki Iwamoto | Associate Professor Tomo Inoue | YU Momoeda |

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