

FUTURE FOLDS: CONTEMPORARY INVESTIGATIONS IN ORIGAMI

11 JULY TO
10 AUGUST
2024



RMIT University acknowledges the people of the Woi wurrung and Boon wurrung language groups of the eastern Kulin Nations on whose unceded lands we conduct the business of the University. RMIT University respectfully acknowledges their Ancestors and Elders, past and present RMIT also acknowledges the Traditional Custodians and their Ancestors of the lands and waters across Australia where we conduct our business.



Tomohiro Tachi, *Freeform Origami Tessellation*, 2013-2015, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.



CONTENTS

1 Foreword

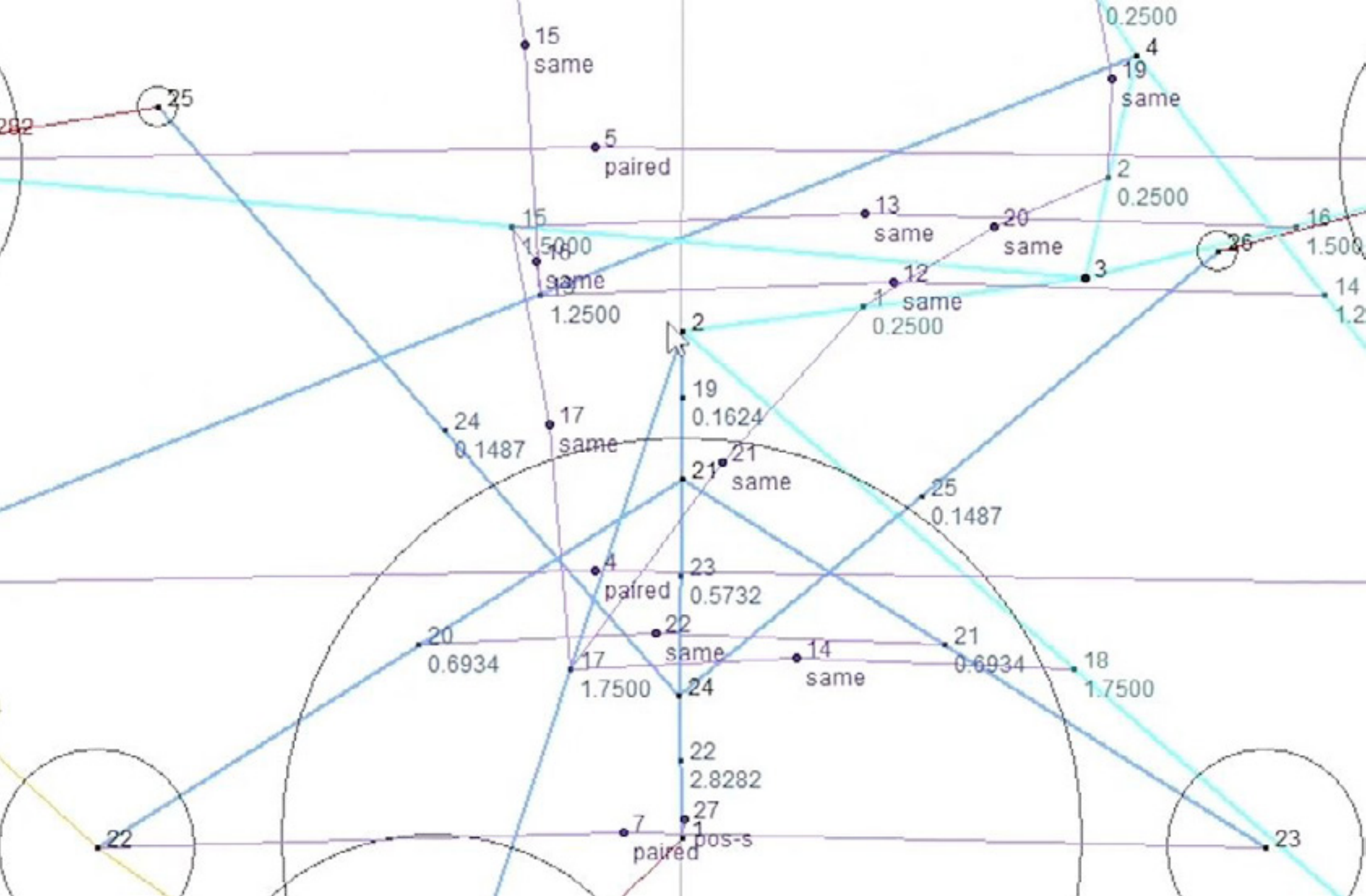
by Helen Rayment

3 From art to science and science to art

by Malte Wagenfeld and Sukanya Deshmukh

27 Biographies

34 List of works



FOREWORD

Helen Rayment
Manger, RMIT Galleries

We are delighted to host the exhibition *Future Folds*, a project that investigates how origami is driving innovation in contemporary design, technology and material science. In this exhibition, artists and designers explore, re-imagine and re-apply the practice of folding to enable new possibilities across various fields, from art to architecture, fashion, robotics and space exploration. RMIT University is committed to advancing design research that looks toward the future, and *Future Folds* encapsulates our university's focus on the intersection of emerging technologies and creative practice.

This project highlights how origami, a traditional practice often associated with paper, is increasingly at the forefront of innovative engineering solutions. The intricate folds that once delighted us as a craft activity now serve as building blocks for next-generation materials and adaptable structures, redefining how we understand form's very relation to function. Through this exhibition, we are

invited to see how the principles of folding generate new aesthetic possibilities – and also how they enable radical approaches to complex problem-solving in technology, sustainability and mathematics.

We are grateful to the artists, designers and engineers who contributed to this exhibition. Their works and research make *Future Folds* a compelling and playful exploration of creativity and invention. We also extend our heartfelt thanks to the project curators, Malte Wagenfeld and Sukanya Deshmukh. Their research, which intertwines design experimentation with speculative thinking, provides important insights into the future of design and the possibilities inherent in materials. We are also excited that this exhibition is being used as framework for their *Future Skins* course and that, through this course, the project is able to connect deeply with many of our School of Design students. For our galleries this is an exciting example of how contemporary research and pedagogies can be connected

to enable a real-world practical exploration into how design can shape tomorrow's innovations.

Finally, we would like to acknowledge 8OSME, an international conference on 'Origami in Science, Mathematics and Education' that is being hosted by Swinburne University of Technology from 16 to 18 July 2024. *Future Folds* is proposed as a means to connect with not only our RMIT community and local audiences, but also to those attending 8OSME. We hope that this exhibition broadens and amplifies the academic discussions had at this conference whilst also celebrating the practice and possibilities of origami.

We invite you to explore the works in this exhibition with an eye to both their artistic and technological significance, and to consider how the traditional practice of folding might help shape our future.

From art to science and science to art

Malte Wagenfeld and Sukanya Deshmukh

The *Future Folds* exhibition came about through a combination of happenstance, good fortune and opportunism. We have been exploring the potential applications of origami in design and innovation: Sukanya through her PhD and Malte as her supervisor. This investigation connected us to the international origami community, ultimately leading to us becoming part of a successful bid to bring the 8th OSME conference to Melbourne. This major international event saw many of the world's most influential origami researchers – whose practices span mathematics, engineering, science, art and design – gather together in Melbourne.

We seized this opportunity to devise an exhibition to reveal new directions in interdisciplinary explorations of origami. Rather than simply exploring origami as a 'folded' outcome, the central premise was to showcase the ideas, explorations, calculations, computations, processes and praxis, which led to the creation of these exquisite objects. Locating this exhibition at RMIT, a university of design and technology, and in the Design Hub Gallery, a leading gallery of design research, was a perfect fit.

Although the exact origins of origami are difficult to trace (as paper, and hence the folding of paper, was developed in various forms across many cultures), it is in Japan where the artform took on major cultural significance. The term origami originates from the compounding of two Japanese words: 'oru' meaning 'to fold' and 'kami' meaning 'paper'. Traditionally Japanese origami was known as the artform of creating figurines from paper and was

categorized as either ceremonial or recreational. Origami began to transcend these traditional figurative forms in the 1950s through the work of practitioners such as Akira Yoshizawa. While the work of the Spaniard Miguel Unamuno (circa 1902) precedes Yoshizawa, his work did not spread much beyond Spanish speaking nations at that time – and therefore did not result in a major influence on modern origami.

Over the course of the 20th century, developments in origami techniques saw two distinct genres emerge – figurative or representational origami and abstract or geometric origami. Within these genres, there are numerous subtypes. For example, within the geometric styles we can identify categories such as modular origami, curved crease origami, tessellations and many more. However, in contemporary origami it is not uncommon for these genres to overlap. Developments in

research areas such as computational origami and recreational mathematics, along with fabrication technologies like laser-cutting, have pushed the artform towards more specialised outcomes. In the last 50 years other academic disciplines started taking interest in the artform, using origami to solve many mathematical and scientific problems. From the first OSME conference –organized in collaboration with the Centro Diffusione Origami in Bologna Italy in 1989 – to the present day, origami has lent itself to several significant applications. Notable are the folding solar array of the Japan Aerospace Exploration Agency (JAXA) which uses the Miura Ori corrugation; medical applications where self-folding nanobots operate inside the human body; and the application of origami to aid people with neurodivergence. The *Future Folds* exhibition explores these more recent developments in origami, juxtaposing the physical works

of leading international practitioners with the research and processes that underpin them.

The Design Hub Gallery is a striking architectural volume. Devoid of furniture, cabinetry or windows, this tabula rasa provided us with significant curatorial freedom. Entering the exhibition from the Design Hub forecourt, one encounters a long slim shelf of light boxes spanning the left-hand side of the gallery. On the right are large floating screens and in the centre sits *Orochi* (2021), Tomoko Fuse's masterful large-scale tubular corrugations. Through this arrangement our intent was to contrast the vast volume of the gallery with the intricate delicacy of the origami objects. Placing these objects on light boxes in a semi-dark gallery highlighted their finely faceted geometry and, importantly, concentrated the audience's attention on the works, with the viewing experience intensified by the surrounding spatial volume.



Installation view of *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.



Installation view of works by Jun Mitani and Robert J. Lang, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.

The works are grouped by artist and thematically arranged in terms of process and intent. Beginning with the inherently artistic and craft-based explorations of Tomoko Fuse, to the self-folding structures of Assoc. Prof. Koya Narumi, through to the computationally generated geometries of Prof. Jun Mitani and Dr. Robert Lang, then encountering the explorations of Prof. Tomohiro Tachi and Assoc. Prof. Koya Narumi, and finally the innovations resulting from the collaboration with ISSEY MIYAKE INC. How the origami objects are created – the process of conceiving and making, and the ideas that drive this exhibition – is projected via a five-channel video onto the five floating screens, which themselves take on the form of a gently folded piece of origami. The work of each artist was screened consecutively as a progression of investigations reflecting those presented across the lightboxes. To accompany this a soundscape was created by recording a range of Foley

soundbites. This included recordings of creasing and folding different types of origami paper, clicking a computer mouse (used for videos that revealed computational processes) and the sound of a new packet of origami paper being opened (used between each segment to signal a new artist). The process of envisioning and mounting the exhibition, and creating the video work and soundtrack was a highly collaborative creative act between ourselves and the RMIT Culture team. Ideas were freely discussed, jammed and developed – often in-situ.

An underlying theme explored in *Future Folds* is the oscillation between art and science, and science and art – how each informs and inspires the other. The exhibition begins with the work of Tomoko Fuse, who is considered a Japanese origami master. Fuse predominantly works in the field of geometric origami and has written over 60 books spanning

many genres from simple figurative work to modular origami, tessellations and corrugations. Fuse foregrounds the act of folding with hands without the use of tools and ‘thinking through folding’ to discover new patterns. Although she is the only artist featured in the exhibition without a formal research-based practice, Fuse’s highly explorative and methodical approach constitutes a form of research *through* practice, wonderfully illustrated in her work on spirals, shown in the exhibition. Her book *Spiral* (2012) explains how each piece leads on to the next or is an amalgamation of concepts, much like Timothy Ingold’s notion of meshwork in which each point in the mesh influences and is influenced by the other¹. Each of her works begins by identifying the parameters that affect the folding. She then explores what happens when certain parameters are fixed or changed – a model of experimentation that informs her larger or more complex pieces. For her work with tessellations for example,



Tomoko Fuse, *Orochi*, 2021, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.



Tomoko Fuse installing *Orochi*, 2021, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024. Still from video recording by Simon Maisch and Tim McLeod.

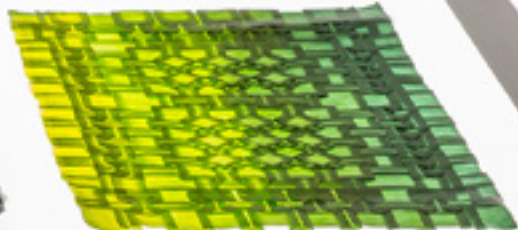
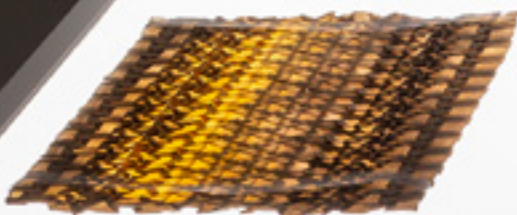
Tomoko Fuse is widely considered a modern master in the world of origami. Using repetitive folds to produce strikingly beautiful works of shifting colour, her work ranges from intricately patterned and delicately balanced pieces to large dynamic installations capable of being manipulated in space.

Fuse's work is characterised by abstract geometric forms, often using tessellations, compositions and modular origami, where repetitive units combine to create remarkable emergent forms. Her origami models published by the national perspective of origami, in her book *Origami Art*, Fuse describes the creative process of origami as "as much as we fold, unfolding the actual allows the form to slowly take shape through the action of folding rather than imposing a predetermined outcome."

Throughout her career, Fuse has explored geometric origami, compositions, tessellations, and pleated folding.

Origami
Tomoko Fuse is a renowned origami practitioner and designer. Her work explores the art of folding paper into intricate geometric forms, often using tessellations, compositions and modular origami. Her work ranges from intricately patterned and delicately balanced pieces to large dynamic installations capable of being manipulated in space.

TOMOKO FUSE
Born 1937, Tokyo, Japan. www.tomoko-fuse.com
Works from 1960s to 2024
Front and Back Triangle Feb 3, 1961
Triangle Series 2007
Whispering Squares Part of the *Interiors* Series, 2001
Hidden Square Pattern, 2002
Her work has been exhibited internationally, including at the Venice Biennale 2013 and the Venice Biennale 2019. Her work has been published in numerous books and magazines, including *Origami* by John Montroll and *Origami* by Robert Lang.



Installation view of works by Tomoko Fuse, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.

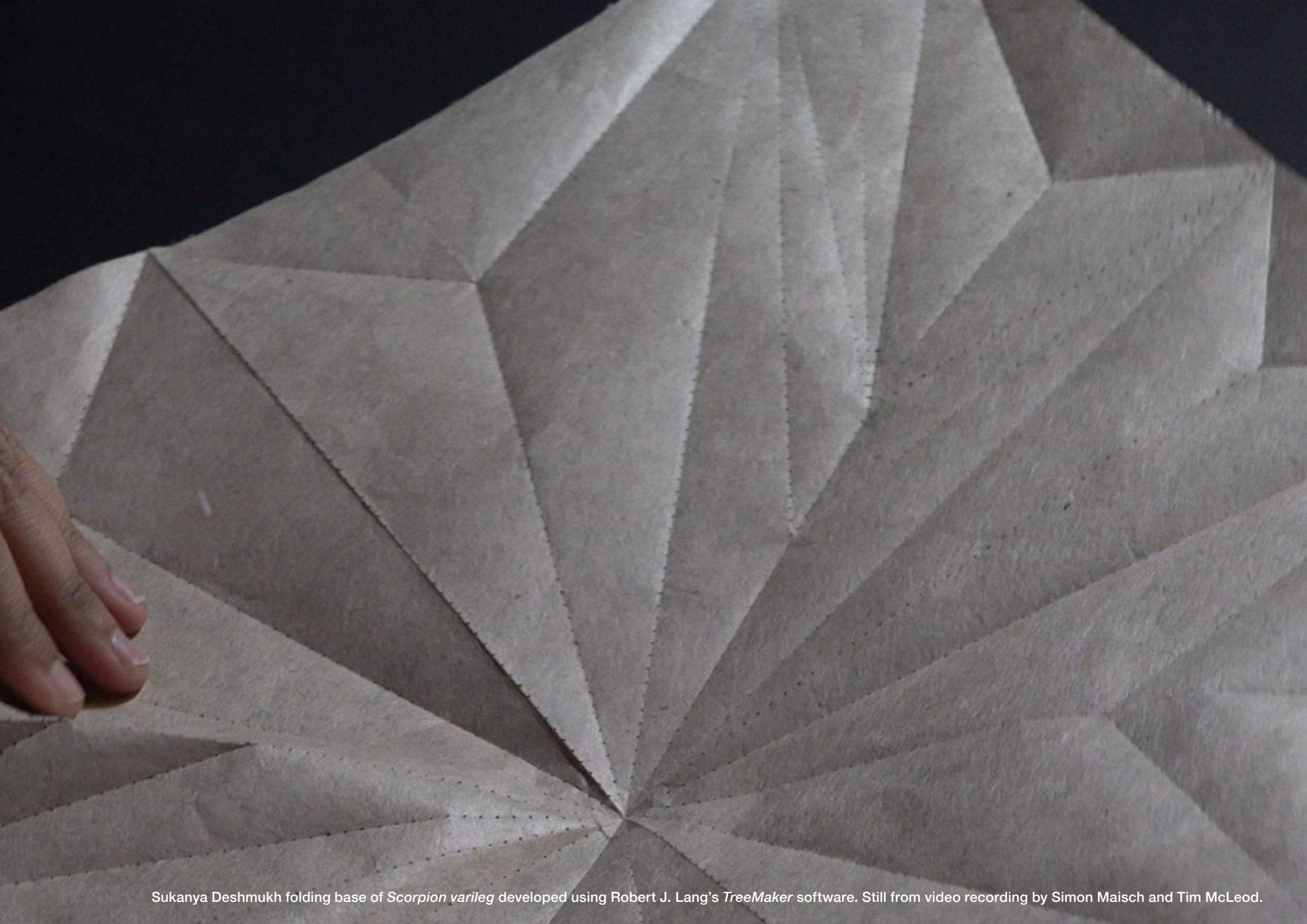
Fuse ingeniously combines simple twist-based tessellation techniques to form the almost tapestry-like pieces presented in this exhibition. The centre piece of *Future Folds* is Fuse's artwork *Orochi*, which uses a variation of the Miura-Ori corrugation. The innovation of this work is in how she alternates the angles in each row, which leads the normally flat Miura to curl into a tube. The tubes of various dimensions are then stretched to create an organism-like composition inspired by the Japanese mythical creature 'Yamata no Orochi'. The *Orochi* tubes are highly flexible, and a significant aspect of this work is how Fuse 'performs' the installation process. During the panel discussion, Fuse remarked that the making and installation of these pieces is for her a mediative process, which can lead her into a flow state.

Like Fuse, Dr. Robert Lang is recognised globally as one of the most prominent

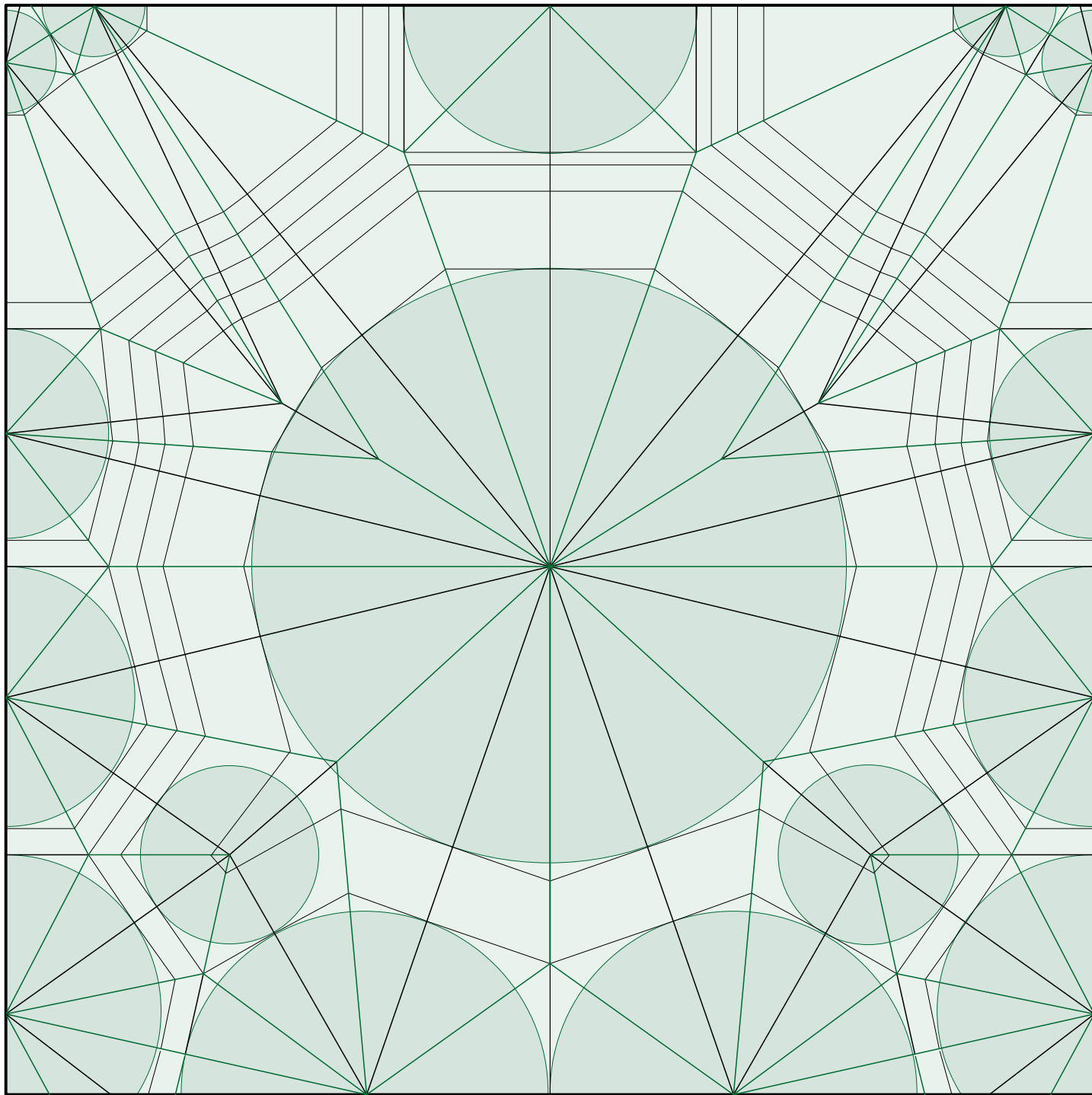
contemporary origami artist and theorists. Among the many publications he has authored, Lang's books *Origami Design Secrets* (2003) and *Twist, Tilings and Tessellations* (2017) are seminal. His early origami work involved many figurative and action models, and he has collaborated with numerous artists, including John Montroll and Stephen Weiss. In the 1990s he was a key figure in the so-called 'Bug Wars', an informal competition in which Lang and many other artists were motivated by the challenge of how far one could take the act of folding a sheet of paper, moving away from the traditional origami bases² enabled the creation of models with multiple appendages. This discovery quite literally transformed origami and made possible the complex life-like models we see today. Armed with the knowledge of the then new diagramming systems of origami and the generosity of the global origami community, origami moved from being an oral tradition

to being documented, enabling it to transcend borders. Initial breakthroughs, after Yoshizawa, came through the work of John Montroll in the USA and Jun Maekawa in Japan. The next powerful revolution was the development of mathematical models such as 'Circle Packing and Tree Theory', which was independently developed by both Lang and Toshiyuki Meguro, and visualised an object or form as a stick-figure-like tree diagram with the form's appendages depicted as lines off the main body. These lines had circles attached to the end, the radius of which is equal to the length of that appendage. These circles are then arranged to make the final 3D model with an efficient use of paper.

Inspired by these innovative models, Lang realised that the creation of life-like resemblances required advanced techniques and precise calculations; this led him to employ computer programming and develop *TreeMaker*



Sukanya Deshmukh folding base of *Scorpion varileg* developed using Robert J. Lang's *TreeMaker* software. Still from video recording by Simon Maisch and Tim McLeod.



Robert J. Lang, crease pattern for *Scorpion varileg*, *Opus 379*, 2003. Image courtesy of the artist



Robert J. Lang, *Scorpion varileg*, Opus 379, 2003. Image courtesy of the artist.

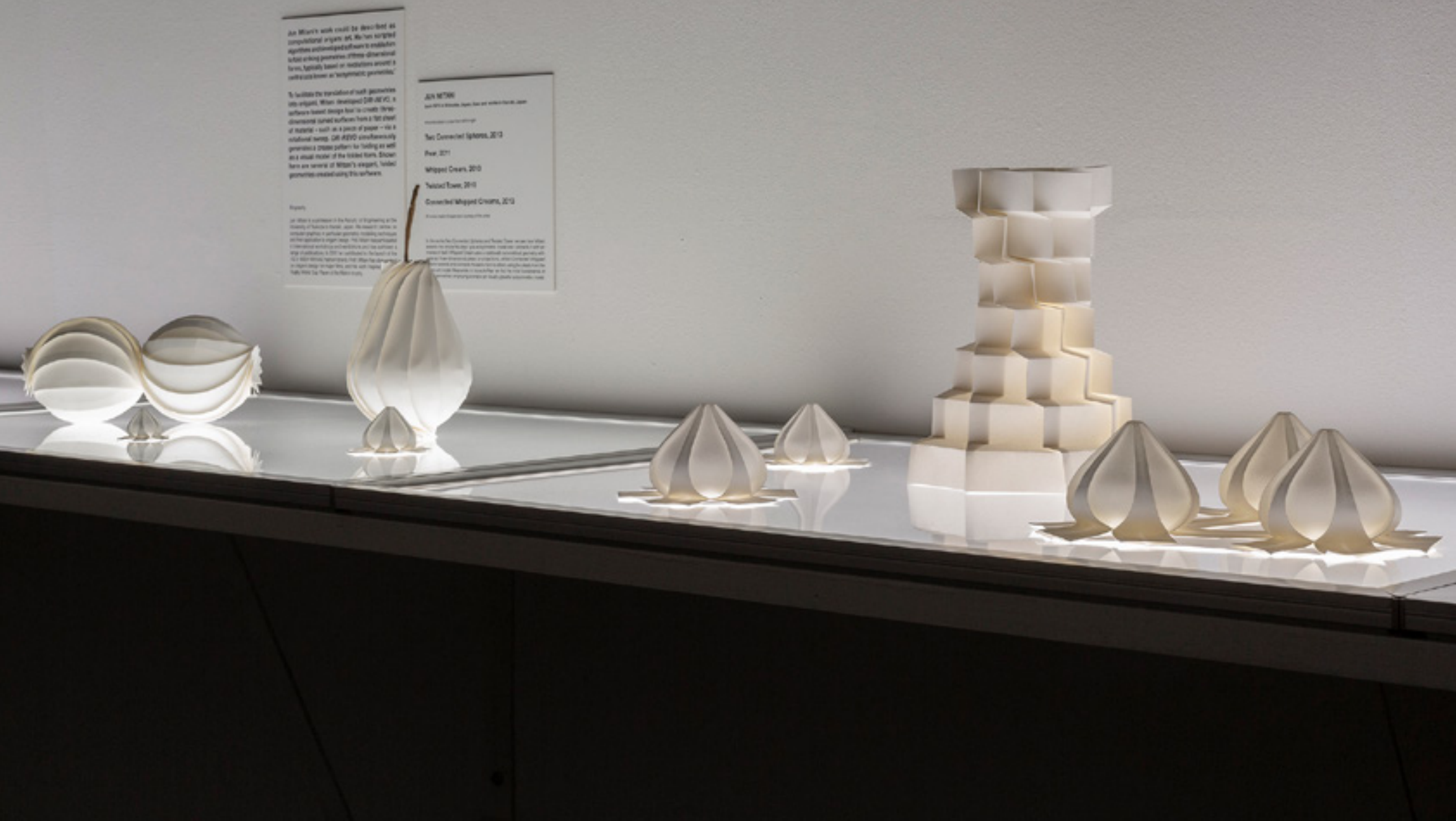
(1994), the first software specifically developed for origami. Lang's exhibited works include a screen-recording of TreeMaker being used to create an origami crease pattern for a scorpion model (one of the first forms created using this software). Exhibited is *Scorpion varileg, opus 379* (2002), Lang's original scorpion model, which necessitated the development of this software. This work is displayed alongside a folded base for a scorpion model, which was generated for the five-channel video work and folded by Sukanya Deshmukh.

Adjacent to Lang's figurative works are a series of captivatingly beautiful, curved origami sculptures made by Prof. Jun Mitani. Curved origami is a relatively recent development in which Mitani is a pioneer. He published the first dedicated book on this subject, *3D Origami Art* (2016). Mitani's research focuses on computer graphics with an emphasis on geometric modelling.

To aid origamists in folding complex curved origami structures, Mitani has developed several significant stand-alone software programs: *Ori- Ref*, which is used to generate origami patterns based on reflections, and *ORI- REVO*, which designs an origami model based on revolutions around a central axis (known as 'axisymmetric geometries'). Video recordings of *Ori- Revo* in use is displayed during the exhibition to demonstrate the development of a straight-line geometrical model *Twisted Tower* (2010) and the curved axisymmetric model *Whipped Cream* (2010). Creating such geometric models would be extremely difficult without the computational power of these programs. Mitani's folded works show progress from fundamental geometries to sophisticated tessellation of these simpler forms.

With a background in architecture, computer graphics and engineering, Prof. Tomohiro Tachi's research explores

spatial and kinematic origami through computation. Tachi's initial interest in origami began in his early years with figurative origami and the connection between art and geometry. This motivated him to study architecture, in which he incorporated his fascination for origami. His notable contributions in the field include investigations into rigid origami, Bi-Stable structures and creating architectural spaces informed by origami. Tachi has also collaborated with other origami experts including Erik Demaine, an MIT professor investigating geometric folding algorithms and computational origami. Together they created *Origamizer*. This standalone software, shown in the exhibition, demonstrates how any form can be converted into a polygonal mesh to generate a crease pattern that folds into the original desired form. Tachi used *Origamizer* to create an origami interpretation of the famous Stanford Bunny (a computer graphics 3D test model) which notably took him



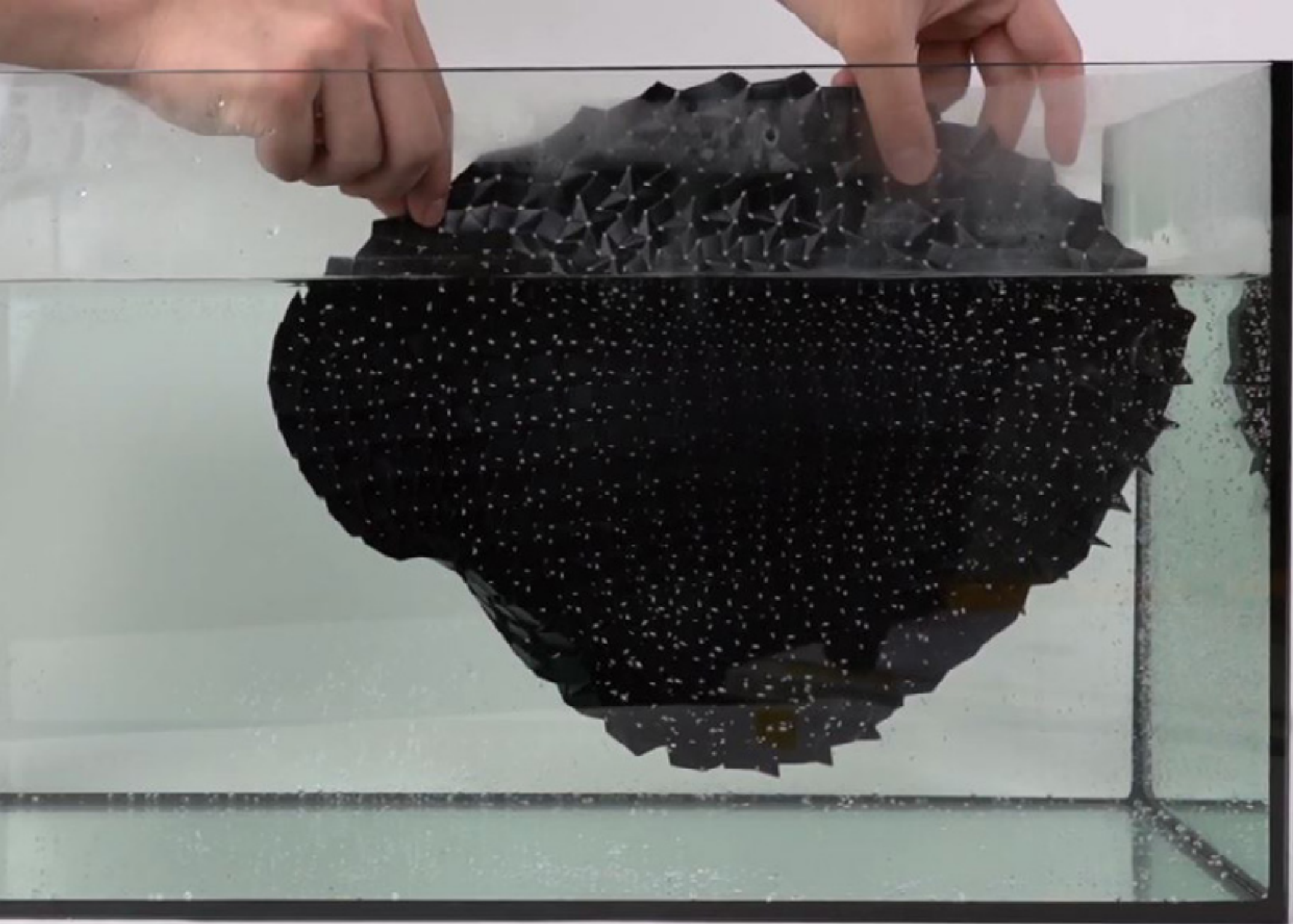
Installation view of works by Jun Mitani, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.



Tomohiro Tachi, *Origami Stanford Bunny*, 2007, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.



(Pages 18, 19 and 20) Koya Narumi, Kazuki Koyama, Kai Suto, Yuta Noma, Hiroki Sato, Tomohiro Tachi, Masaaki Sugimoto, Takeo Igarashi and Yoshihiro Kawahara, *Inkjet 4D Print*, 2023 (still of cap), digital video. Images courtesy of the artists and designers.





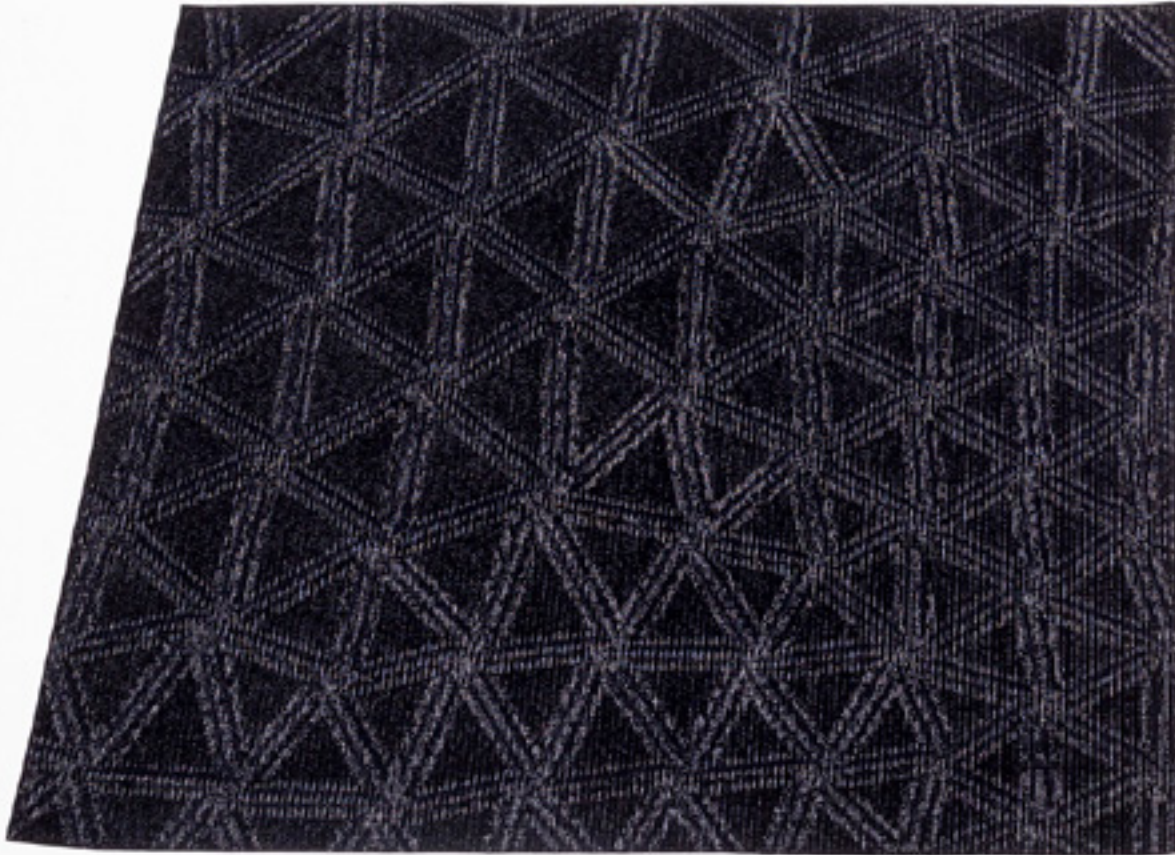
more than 10 hours to fold. Within the exhibition the original *Origami Stanford Bunny* (2007) was placed on a print of the crease pattern to illustrate the intricate complexity of the fold. Also presented was a striking and brilliant stainless-steel sculpture by Tachi. This free-form origami tessellation from the 'Waterbomb' family was developed using his software *Freeform Origami* (2010). Tachi's more recent explorations include his collaborations with other researchers – including exhibitor Koya Narumi – which investigate self-foldability and self-folding structures.

Assoc. Prof. Koya Narumi's research stems from his expertise in Human Computer Interaction (HCI) and computational fabrication, and focuses on self-folding origami structures. Although Narumi was not an origamist, his research specialization allowed him to develop a self-folding fabrication method for 3D origami tessellations

using ultraviolet inkjet prints on heat shrink plastic film. The additional application of the ink impacts how the film shrinks, resulting in the sheet taking particular shapes under heat. By strategically leaving gaps between the inked sections, the designer can dictate how specific parts of the sheet fold. Applying hot water to the flat sheet causes it to spontaneously fold into a complex origami structure. This project is significant as it pushes the boundaries of both existing mediums, that of inkjet printing and origami. In order to create objects that fold using principles of origami, Narumi worked with Prof. Tachi, Kai Suto, Yuta Noma and Kotaro Tanimichi to develop *Crane*, a CAD software plugin for Rhino and Grasshopper. *Crane* aims to address the challenges for designers to design, simulate and fabricate objects using computational origami. It enables the designer to select a particular type of crease pattern, parametrising the given

origami corrugation and calculating the required gap such that the desired form can be folded from a rigid material sheet. This technology was used not only to generate the gaps in the self-folding models shown, but also to design the garment patterns for his collaboration with A-POC ABLE ISSEY MIYAKE.

The unique aspect of the Miyake Design Studio is how design innovation is driven by such research-led collaborations. The Miyake Design Studio was established by Issey Miyake in 1970 as a laboratory for researching, planning and creating clothing that is both socially conscious and universal in nature. It is rooted in Miyake's touchstone idea of 'A Piece of Cloth' (A-POC). A-POC ABLE ISSEY MIYAKE was launched in 2021 as an experimental, technology-driven offshoot of the Miyake Design Studio. Led by Yoshiyuki Miyamae, this design team inherits the thinking of Issey Miyake and combines emerging technology,



ISSEY MIYAKE INC., Textile swatch of *TYPE-O (before steam)*, 2024 and textile swatch of *TYPE-O (after steam)*, 2024, in *Future Folds*, RMIT Design Hub Gallery, Melbourne 2024.

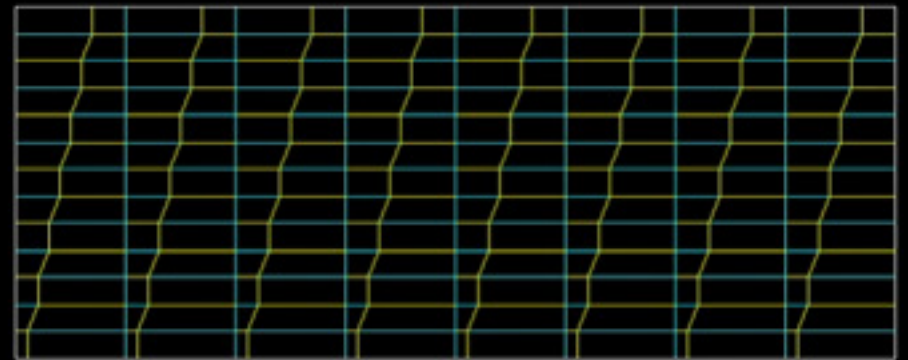
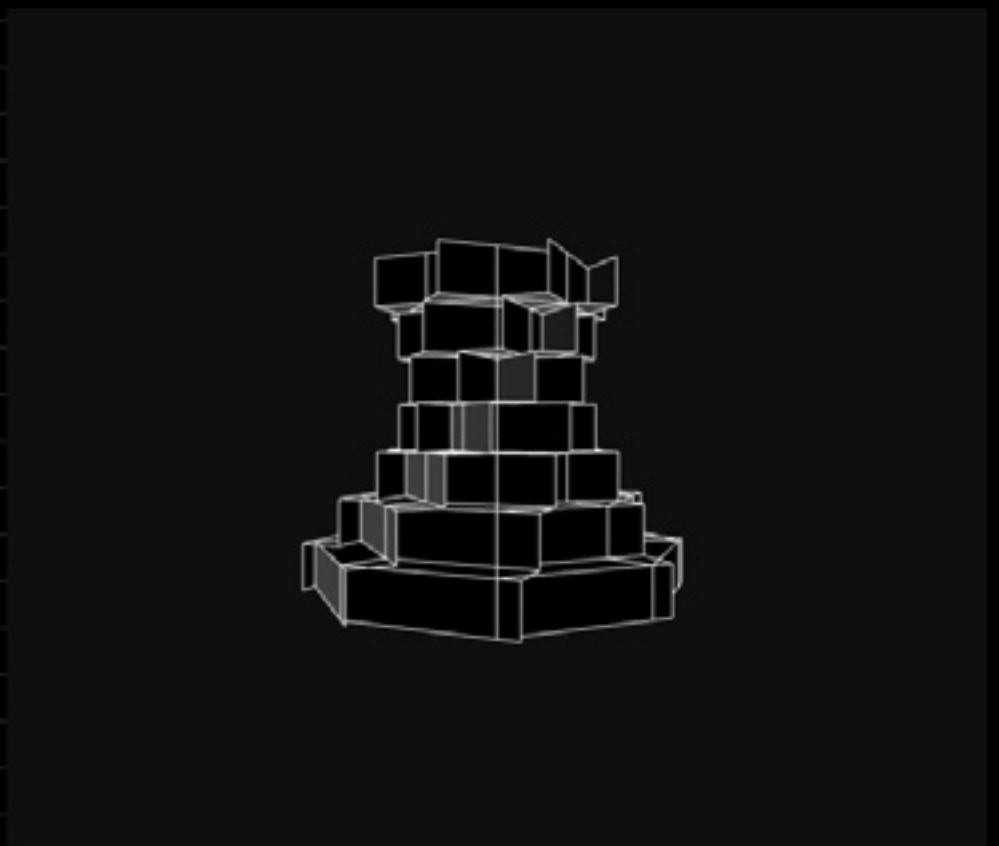
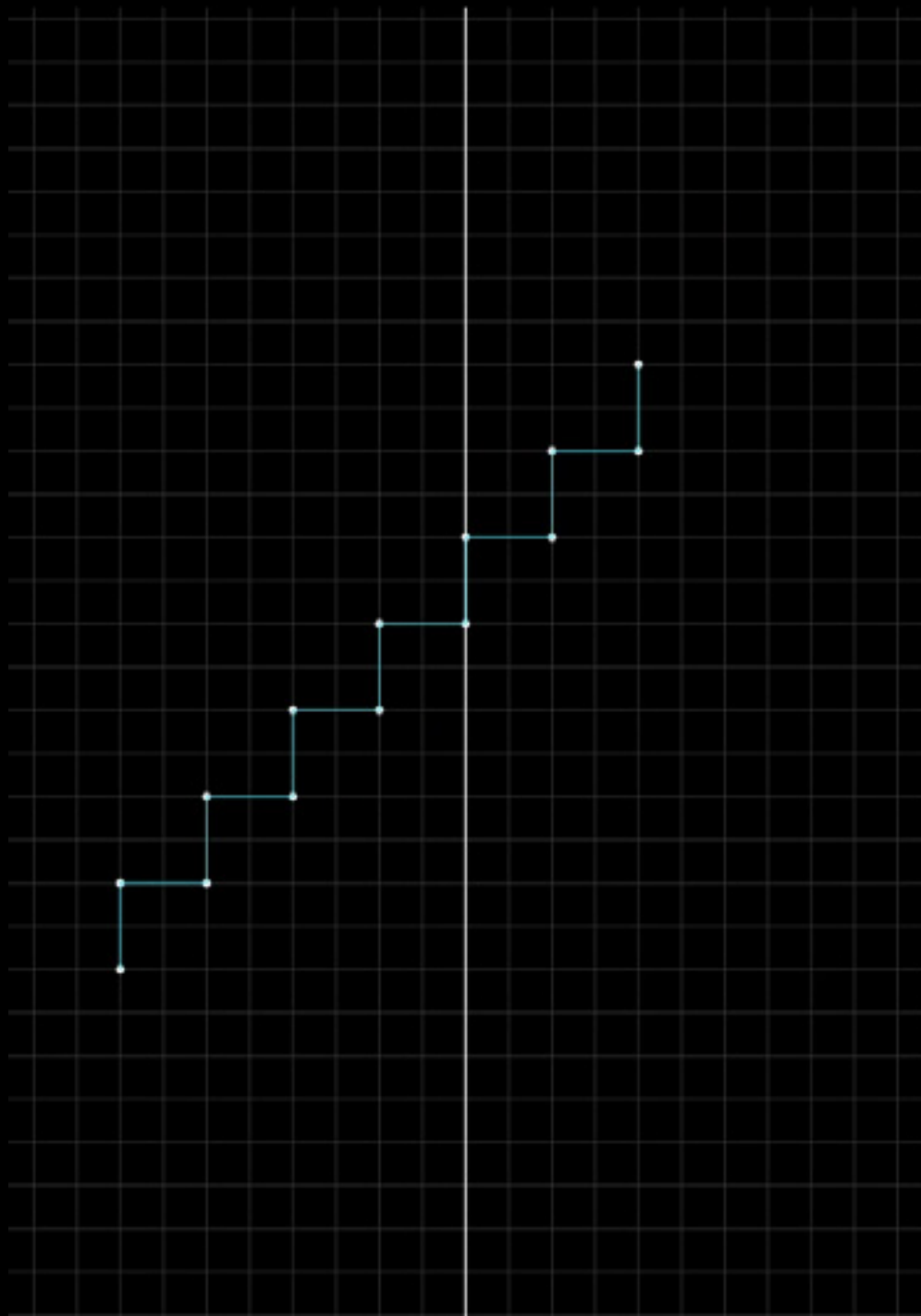
traditional craftsmanship and artistic creativity. Much of Miyake's work involves the considered folding and tessellating of a single piece of cloth to create three-dimensional pieces of clothing, unambiguously linking Miyake's design practice to the world of origami. In place of the traditional stitching and assembly of multiple cut pieces, A-POC ABLE ISSEY MIYAKE amplifies the potential of a single piece of cloth by building into that cloth those elements required for it to transform itself into a shaped piece of clothing.

The work shown in this exhibition is a collaboration between ISSEY MIYAKE INC. and Nature Architects. It involves A-POC ABLE ISSEY MIYAKE's 3D Steam Stretch fabric technology, where specific threads are woven into a fabric that shrinks when heat is applied, causing the cloth to become three-dimensional. It also involves a unique design technology called 'Direct Functional Modelling' from

the engineering design company Nature Architects, which generates a diagram for the complex pleated geometry and calculates the fabric's shrinkage pattern to enable transformation into the desired shape. This collaboration brings together computational design, material innovation and origami to make innovative fabrics and clothing that could not have been created using traditional techniques.

Exhibiting the work of artists, mathematicians, engineers, scientists and designers alongside each other in *Future Folds*, fascinating insights emerged. These include the overlapping of these disciplinary borders and the free flow of ideas and skillsets between these disciplines; it becomes evident that most of these practitioners are polymaths working across some or all of these disciplines. Robert Lang trained and worked as an engineer and physicist, and although his work in origami spans and is driven by mathematics and computational

origami, he foremost considers himself an origami artist. Tomohiro Tachi began as an architect but now works in the field of structural engineering and computational mathematics. Jun Mitani is an engineer, but his explorations in axisymmetric geometries enabled by his software-based design tool allow him to create three-dimensional curved surfaces from a flat sheet of material that could be described as computational origami art or sculpture. But what links all of this work, including of course that of Tomoko Fuse, is the act and process of craft. Origami requires great skill and dexterity as well as knowledge of how material behaves and can be manipulated. As Richard Sennett emphasizes in his book *The Craftsman* (2008), craft is primarily about the process rather than the end result; this involves a cybernetic feedback loop between thinking and doing, thought and action. The craftsperson learns through the act of doing, resulting in a constant iteration of skill and knowledge.



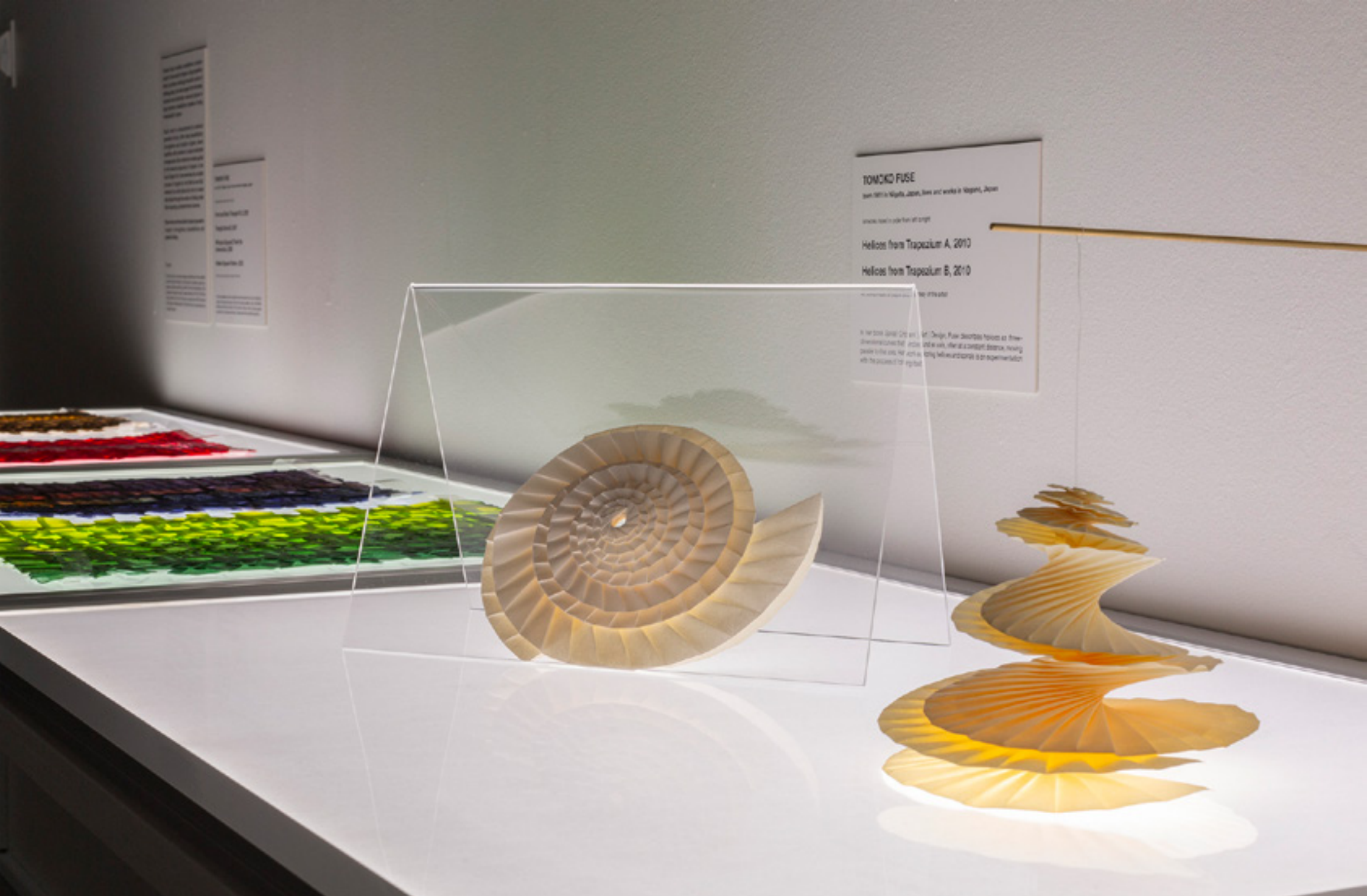
Craft is a form of thinking where physical manipulation and mental engagement coevolve. For example, although the forms for Jun Mitani's works *Two Connected Spheres* and *Twisted Tower* are computationally derived, the ability to conceive of and fold these forms requires the knowledge, skill and sensibilities of a craftsperson.

Naming this exhibition *Future Folds* is a provocation, but the significant insights of the works exhibited evidences how a traditional craft can inspire, influence and be influenced by disparate disciplinary fields and lines of investigation. While this exhibition investigates origami's relations to mathematics, physics, material science and engineering, this is really only a snapshot; origami now reaches into many other unexpected fields including medicine and cell-biology³.

During the panel discussion Robert Lang and Tomoko Fuse were questioned about the future of origami. Fuse promptly replied that she doesn't know and that 'not knowing' is actually a good thing as there are many more territories to be explored. Lang responded that whatever is being developed today, especially through the OSME conferences, would always be the edifice on which new developments would be made.

NOTES

- 1 Tim Ingold, 2013, *Making Anthropology, Archaeology, Art and Architecture*, p 132.
- 2 In his book *Origami Design Secrets*, 2nd edn., Dr. Robert Lang describes Origami bases as "a regular geometric shape that has a structure similar to that of the subject, although it may appear to bear very little resemblance to the subject."
- 3 For example the work of Kaori Kuribayashi-Shigetomi who developed a 'origami stent graft' and is now working with origami on the cellular level generating three-dimensional (3D) cell-laden microstructures applying origami folding techniques.



Installation view of works by Tomoko Fuse, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.

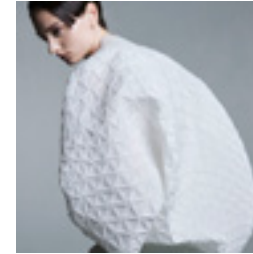
ARTIST BIOGRAPHIES



Jun Mitani is a professor in the Faculty of Engineering at the University of Tsukuba in Ibaraki, Japan. His research centres on computer graphics, in particular geometric modelling techniques and their application to origami design. Prof. Mitani has participated in international workshops and exhibitions and has authored a range of publications. In 2010 he contributed to the launch of the 132.5 ISSEY MIYAKE fashion brand. Prof. Mitani has also worked on origami design for major films, and his work inspired the 2019 Rugby World Cup Player of the Match trophy.



Koya Narumi received his PhD in 2020 from the University of Tokyo, and he is currently an associate professor in the Faculty of Science and Technology at Keio University in Tokyo, Japan. Assoc. Prof. Narumi's research interests span computational fabrication, human-computer interaction, soft robotics and materials science. He designs innovative daily-use objects – like clothes, food and mobility devices – using digital fabrication tools like inkjet and 3D printers.



The Miyake Design Studio was established by Issey Miyake in 1970 as a laboratory for researching, planning and creating clothing that is both socially conscious and universal in nature. It is rooted in Miyake's touchstone idea of 'A Piece of Cloth' (A-POC). A-POC ABLE ISSEY MIYAKE launched in 2021 as an experimental, technology-driven offshoot of the Miyake Design Studio. Led by Yoshiyuki Miyamae, this design team inherits the thinking of Issey Miyake and collaborates with up-and-coming technology, traditional craftsmanship and artistic creativity. The team expands new manufacturing possibilities by connecting the dots between various industries to create a variety of 'ABLE' products.



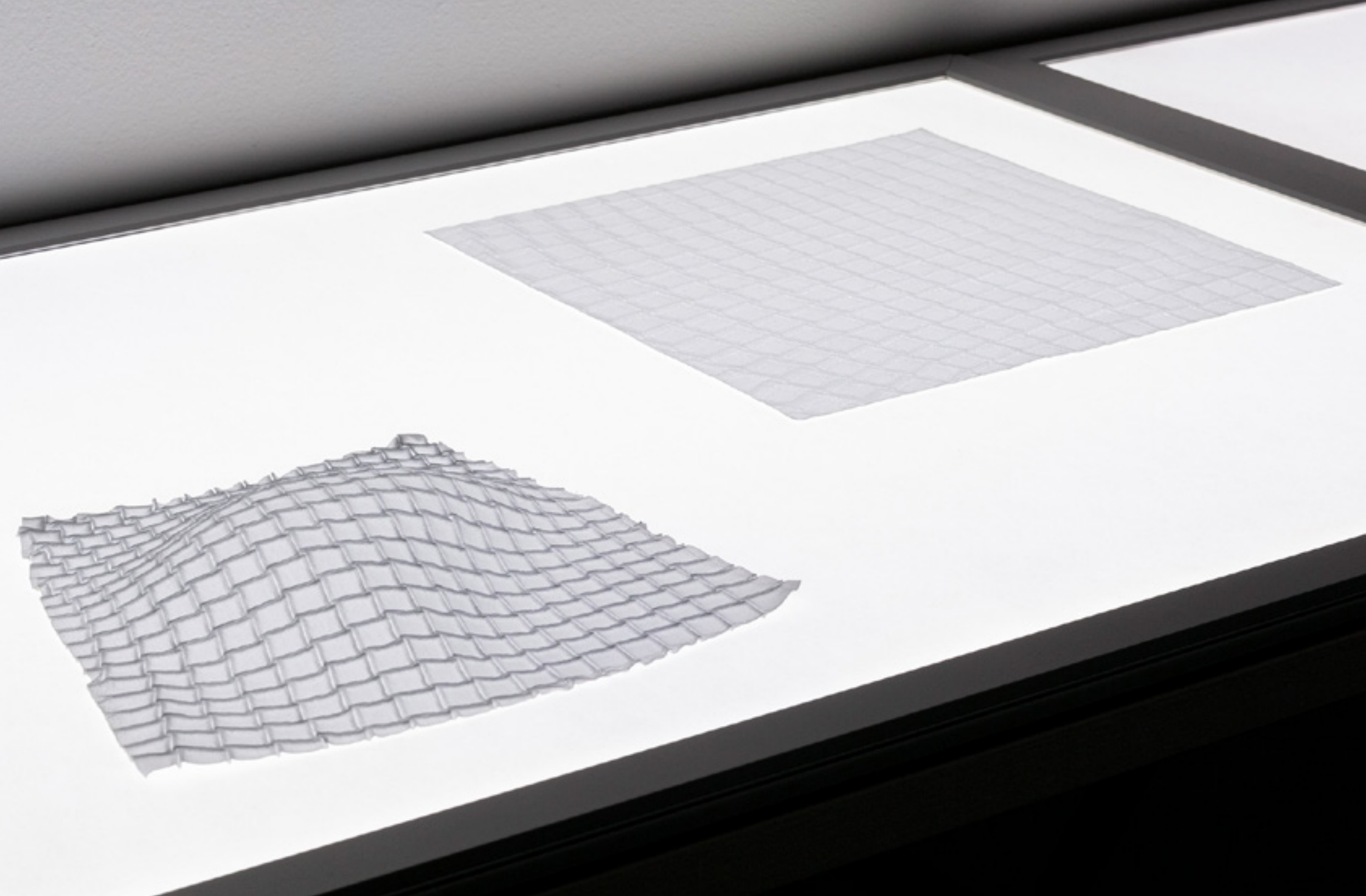
Robert J. Lang is one of the world's leading origami masters, having created 800 designs over 50 years with many of his highly detailed and realistic designs shown in major international exhibitions. Dr Lang has also written numerous books and articles on origami, his research often linking origami with mathematics, science and technology.



Tomohiro Tachi is a professor in the Department of General Systems Studies at the University of Tokyo in Japan. He studied architecture and received his PhD in engineering from the University of Tokyo in 2010. Prof. Tachi has been designing origami since 2002, and he explores three-dimensional and kinematic forms using computation.



Tomoko Fuse is a renowned origami practitioner who has created numerous origami designs, including boxes, kusudama, paper toys, masks, modular polyhedra, geometric forms and tessellations. She studied with origami master Toyoako Kawai from 1970 to 1973 and has published more than 60 books on origami since 1981. Her book *Unit Origami: Multidisciplinary Transformations* is a seminal text on modular origami.



ISSEY MIYAKE INC., Textile swatch of *TYPE-O (before steam)*, 2024 and textile swatch of *TYPE-O (after steam)*, 2024, in *Future Folds*, RMIT Design Hub Gallery, Melbourne 2024.

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...e world's leading origami masters,
...ver 50 years with many of his highly
...own in major international exhibitions.
...erous books and articles on origami,
...igami with mathematics, science

SUKANYA DESHMIKH
born 1994 in Assam, India, lives and works in Melbourne, Australia

Scorpion varileg (base fold), 2023

Banana-fiber paper

Based on crease pattern by Robert J. Lang

Work courtesy of the artist

The origami figure for Scorpion varileg, opus 379 is notable as being one of the first models that was designed using Lang's origami modeling software TreeMaker. Further, Lang states that White-tailed Deer, opus 500 and Maine Looster, opus 447 could not have been designed without TreeMaker.



Installation view of Robert J. Lang's works in *Future Folds*,
RMIT Design Hub Gallery, Melbourne, 2024.

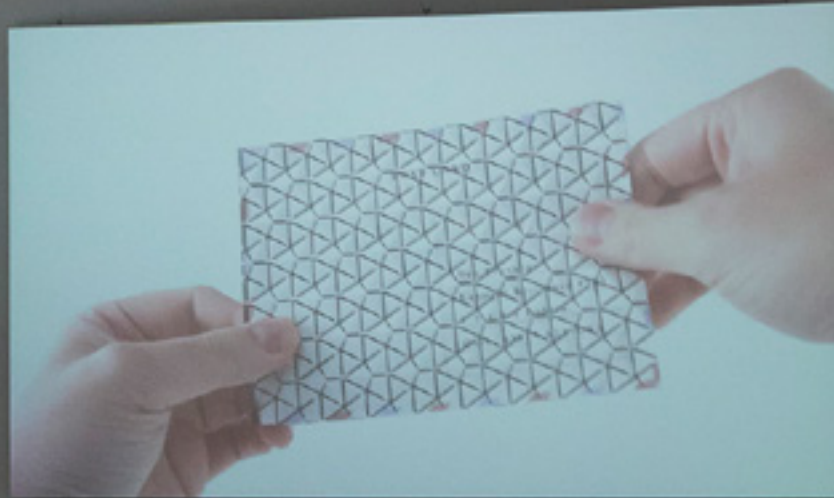
CURATOR BIOGRAPHIES

Malte Wagenfeld is a designer, curator, researcher, installation artist and academic whose experiential installations, designs and texts have been internationally exhibited, distributed and published. His focus is on exploring design responses to climate change and for building a deep understanding of how cultural, social, technological and economic developments drive and are driven by design, and how to reimagine a regenerative design-driven future. Dr Wagenfeld is a senior lecturer at RMIT University where he is Program Manager of the Master of Design, Innovation and Technology.

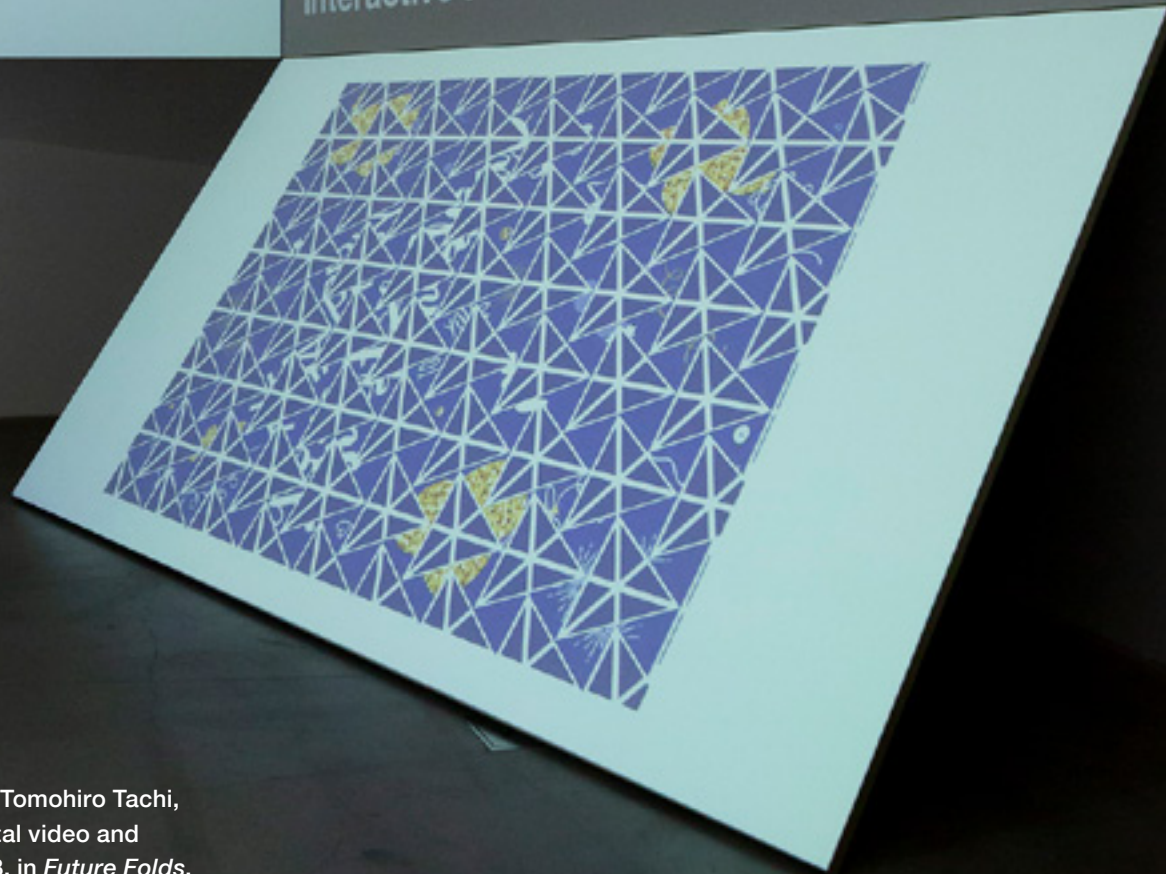
Sukanya Deshmukh is an architect, designer and origami practitioner whose work explores the applications of origami in the design of built environments. Her research explores the potential of deployable surfaces based on rigid origami and investigates their role, in modulating the performance and the experiential qualities of architectural and urban spaces in terms of shaping the acoustics, self-shading, airflow and aesthetics. She is a part of the organising committee for the 8th OSME conference and the Folding Australia Convention 2024 and has been a sessional lecturer in the Master of Design, Innovation and Technology program at RMIT University. Deshmukh is currently undertaking her PhD at RMIT University in the School of Design.



Kai Suto, Yuta Noma, Kotaro Tanimichi, Koya Narumi and Tomohiro Tachi, *Crane*, 2022 (left) and ISSEY MIYAKE INC., *TYPE-I MM project*, 2023 (right), in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.



Interactive Postcard



Koya Narumi, Kazuki Koyama, Kai Suto, Yuta Noma, Hiroki Sato, Tomohiro Tachi, Masaaki Sugimoto, Takeo Igarashi and Yoshihiro Kawahara, digital video and tessellation patterns of *Inkjet 4D Print: Interactive postcard*, 2023, in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.

LIST OF WORKS

ISSEY MIYAKE INC.

TYPE-I MM project, 2023

Digital video, 14 min. 0 sec.

*Textile swatch of TYPE-O
(before steam)*, 2024

*Textile swatch of TYPE-O
(after steam)*, 2024

Light grey and navy textile
woven textile swatches
(Pe 58%, Co 40%, Pu 2%),
4 swatches

Works courtesy of
ISSEY MIYAKE INC.

JUN MITANI

Whipped Cream, 2010

Twisted Tower, 2010

Pear, 2011

Two Connected Spheres, 2013

Connected Whipped Creams, 2013

Works made of paper and
courtesy of the artist

KAI SUTO, YUTA NOMA, KOTARO TANIMICHI, KOYA NARUMI AND TOMOHIRO TACHI

*Crane: An Integrated Computational
Design Platform for Functional, Foldable,
and Fabricable Origami Products*, 2022

Digital video, 5 min. 0 sec.

Acknowledgements: The University
of Tokyo, Nature Architects

Work courtesy of the artists
and designers

**KOYA NARUMI, KAZUKI KOYAMA,
KAI SUTO, YUTA NOMA, HIROKI
SATO, TOMOHIRO TACHI, MASAOKI
SUGIMOTO, TAKEO IGARASHI AND
YOSHIHIRO KAWAHARA**

Inkjet 4D Print: Cap, 2023

Heat-shrinkable sheets with
printed patterns

Acknowledgements: JST ACT-I
(JPMJPR18UN), Value Exchange
Engineering, JST AdCORP
(JPMJKB2302)

Work courtesy of the artists
and designers

ROBERT J. LANG

Scorpion varileg, opus 379, 2002

One uncut square of Origamido paper

Maine Lobster, opus 447, 2004

One uncut square of Korean hanji

White-tailed Deer, opus 550, 2007

One uncut square of Lokta paper,
mounted in frame

Works courtesy of the artist

SUKANYA DESHMUKH

Scorpion varileg (base fold), 2024

Banana-fiber paper

Based on crease pattern
by Robert J. Lang

Work courtesy of the artist



Works by Jun Mitani. Image courtesy of the artist

TOMOHIRO TACHI

Origami Stanford Bunny, 2007
Paper

Freeform Origami Tessellation,
2013-2015

Stainless steel

Works courtesy of the artist

TOMOKO FUSE

*Whirpool+Square2 Twist the
intersection*, 2006

Triangle Dance/S, 2007

Helices from Trapezium A, 2010

Helices from Trapezium B, 2010

Front and Back Triangle/12-3,
2021

Orochi, 2021

Hidden Square Pattern, 2022

Works made of paper and courtesy
of the artist

5-CHANNEL DIGITAL VIDEO

Includes video content produced by
A-POC ABLE ISSEY MIYAKE, Tomoko
Fuse, Takeo Igarashi, Yoshihiro Kawahara,
Kazuki Koyama, Robert J. Lang, Jun
Mitani, Koya Narumi, Yuta Noma, Hiroki
Sato, Masaaki Sugimoto, Kai Suto and
Tomohiro Tachi. All content courtesy
of the artists and designers.

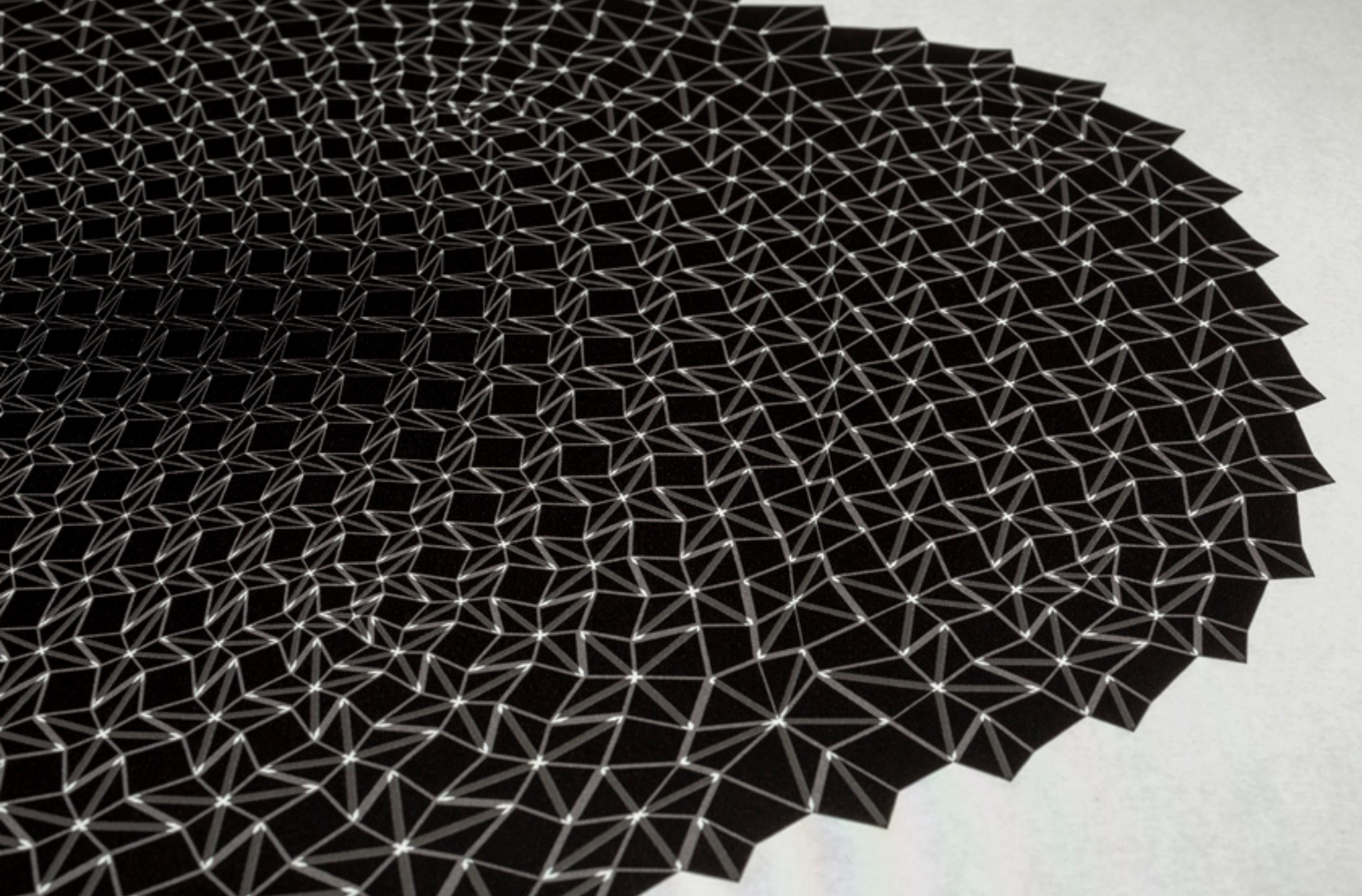
Editing and Post-production by
Pat Mooney

Digital Production Coordinator and
Sound Design by Simon Maisch

Exhibition design and screen layout
by Sukanya Deshmukh, Malte Wagenfeld,
Andrew Tetzlaff, Simon Maisch and
Tim McLeod.

Foley and sound recording by
Sukanya Deshmukh, Simon Maisch
and Malte Wagenfeld

Sound recording from iainmccurdy
(2020). 3D Printer [Sound]. Retrieved
from <https://freesound.org/s/523912/>



Koya Narumi, Kazuki Koyama, Kai Suto, Yuta Noma, Hiroki Sato, Tomohiro Tachi, Masaaki Sugimoto, Takeo Igarashi and Yoshihiro Kawahara, *Inkjet 4D Print: Cap*, 2023 (detail), in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.

EXHIBITION STAFF

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Lisa Linton

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Louise Meuwissen, Celine Saoud

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Production Officer
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Technical Production Coordinator
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Production Assistants
Alex Bloom, Maud Freeman, Audrey Merton,
Vivian Qiu, Melissa Viola

Published on the occasion of the exhibition

Future Folds: contemporary investigations in origami

Curated by Malte Wagenfeld and Sukanya Deshmukh.

With works and contributions by A-POC ABLE ISSEY MIYAKE, Hiroki Sato, Jun Mitani, Kai Suto, Kazuki Koyama, Kotaro Tanimichi, Koya Narumi, Masaaki Sugimoto, Robert J. Lang, Sukanya Deshmukh, Takeo Igarashi, Tomohiro Tachi, Tomoko Fuse, Yoshihiro Kawahara and Yuta Noma.

Exhibition design by Andrew Tetzlaff, Malte Wagenfeld, Simon Maisch, Sukanya Deshmukh and Tim McLeod.

Design Hub Gallery, Melbourne/Narm

11 July to 10 August 2024

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All exhibition photography: Christian Capurro

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Back cover image: Tomoko Fuse, *Front and Back Triangle/12-3*, 2021 (detail), in *Future Folds*, RMIT Design Hub Gallery, Melbourne, 2024.

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