



Design philosophy

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Multiplication of forms in contemporary monumental sculpture

Abstract

Public art is an established instrument of urban planning, serving placemaking, the humanisation of space and destination marketing. This article examines one design strategy within contemporary monumental sculpture: the multiplication of spatial forms, understood as the deliberate replication of modular compositional elements to achieve aesthetic, perceptual and functional effects. Written from within the practice, it reflects on realised public commissions by Mirosław Struzik – *Dandelions* (Dubai, 2017), *Bubble Trees in the Clouds* (College Station, 2025) and *Jellyfish Shrub* (Taiwan, 2024) – together with two photovoltaic sculpture concepts, *Solar Butterflies* (2012) and *Solar Poplars* (2022). The analysis situates the strategy at the intersection of the serial logic of modern sculpture and research on the biophilic appeal of repeated organic form, and identifies three operative mechanisms: the scaling of natural motifs, fractal modular replication, and perceptual multiplication through reflective surroundings. The constraints, reception and risks specific to monumental public commissions are also discussed. The trajectory of the works indicates an evolution from purely aesthetic applications towards sculptures integrating utilitarian, energy-generating functions.

Key words: public art, monumental sculpture, multiplication of forms, modularity, agrivoltaics, placemaking

Introduction

Art plays an important role in urban planning and architectural design processes, and many artists specialise in creating and realising works for public spaces (CODAworx 2025; Frazier Britt 2014; UNESCO 2024; Polat, Gökçen 2022). The integration of art into urban and architectural projects – new developments, renovations, green space design, spatial development plans – is a recognised and standardised practice in public policies worldwide, implemented through programmes such as “Percent for Art” (Polat, Gökçen 2022).

Among the objectives pursued through investment in works of art and the involvement of artists in design pro-

cesses at early stages, the following should be noted: placemaking, i.e., the creation of a unique character of place, the building of identity and landmarks, and of natural meeting points; the humanisation of space, consisting in the transformation of sterile environments into spaces conducive to social interaction and user well-being (Mikuni et al. 2024; Trupp et al. 2025); the improvement of the aesthetics of the surroundings; and the marketing function – the generation of measurable ROI through tourism, social media and place branding, where sculptures serve as attractions in destination marketing strategies (McClimon 2023).

Experience from the realisation of projects in public spaces across diverse cultural contexts demonstrates that a well-conceived and well-executed sculpture can fulfil these objectives and more, often introducing additional, positive and unexpected effects at the site of installation (CODAworx 2025; Polat, Gökçen 2022).

One of the significant phenomena within contemporary monumental sculpture is the multiplication of spatial forms

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– the deliberate replication of modular compositional elements in order to achieve specific aesthetic, perceptual and functional effects.

The serial arrangement of repeated modules is not, in itself, new to sculpture; it carries a substantial theoretical genealogy. In her account of modern sculpture, Rosalind Krauss showed how the serial progression of identical, mass-replicable units displaces the traditional hierarchical, centre-focused composition, denying any single internally dictated point of focus (Krauss 1977). Her subsequent reading of the grid identified regulated repetition as a structure that implies continuation beyond its own boundaries, presenting the visible work as a fragment of a larger, potentially infinite field (Krauss 1979). The works discussed here extend this logic out of the gallery and into public space, where replication operates at architectural scale. A second and complementary body of research concerns why such patterns are perceived as pleasing: studies in the perception of fractal and nature-derived patterns report a consistent aesthetic preference for the scale-invariant, repeating structures characteristic of natural forms, and associate exposure to them with measurable reductions in physiological stress (Taylor 2006; Spehar, Taylor 2013). The intersection of these two lines of enquiry – the serial logic of modern sculpture on one side, the biophilic appeal of repeated organic form on the other – provides the conceptual ground for the strategy examined below.

This article presents an analysis of that strategy drawing on the work of Mirosław Struzik, who for over twenty years has been realising monumental stainless-steel installations with RGB lighting for public spaces around the world. Although written in the third person, it is an account from within the practice rather than external critical commentary: the works analysed are the author's own, and the text sets out the design reasoning behind them. It is offered as a reflection on practice, not as an empirical study; its method is correspondingly the retrospective analysis of completed commissions, examining the formal, spatial and functional decisions that recur across them.

The author

Mirosław Struzik was born in 1956 in Żarów, Poland. In 1989 he graduated from the Academy of Fine Arts in Wrocław, in the Faculty of Graphics, Painting and Sculpture, specialising in sculpture, with the degree of Master of Fine Arts. Before completing his studies, he had already worked for eight years in design studios, where he was granted several invention patents; he also studied industrial design. He now creates sculpture primarily for public space. In 2005 he received the Sugarman Foundation Award (USA). In 2020 he was named one of CODAworx's "25 Creative Revolutionaries" and received a Platinum A' Design Award in the Arts, Crafts and Ready-Made Design category for his *Bubble Forest*.

Design and implementation method

Struzik's method begins with the direct study of nature, and specifically with the observable structures in the flora of the surrounding environment, which he documents extensively through macro photography. These observations are

transposed into an organic, abstract idiom and worked up as scale models. The physical maquettes are then 3D-scanned, after which development continues in the digital domain: the resulting models are placed within three-dimensional reconstructions of the actual sites for which the works are intended – either supplied by the architects working for the client, or built from scratch by the artist's team. Within these site models, realistic lighting simulations are produced in order to design the lighting systems and their control programs. Photorealistic renderings, both still images and video, are prepared with accurate lighting simulation and discussed with the client. Only once these are approved does the team proceed to fabrication, always in coordination with structural engineers, electronics engineers, lighting specialists and architects. The process is correspondingly complex, demanding the coordination of large, multidisciplinary teams. Finished works are shipped to the client in parts – frequently in forty-foot sea containers – and assembled and installed on site, either by the STRUZIK ART LTD team or by specialist workers engaged locally.

Selected realisations

Dandelions – Burj Khalifa, Dubai, United Arab Emirates, 2017

The *Dandelions* concept originated in 2013 on the occasion of the realisation of an outdoor sculpture in front of a corporate client's headquarters. This work was included on CODAworx's TOP 100 public art list for 2013. Subsequent iterations of the concept gained international recognition, resulting in a commission from Emaar (2017) for a set of 14 elements complete with lighting and installation services for the public space adjacent to the Burj Khalifa tower in Dubai (Struzik 2017) (Figs. 1, 2). The sculpture was fabricated and installed on site by the STRUZIK ART team.

The spatial relationship between sculpture and architecture was based on the principle of contrast harmony: the linear geometry of the surroundings was juxtaposed with the curved forms of organic abstraction. The scaling of plant motifs from the micro to the macro scale produces an effect of cognitive surprise – a transposition of the observer into an altered scale of perception. The dandelion head itself was generated through serial replication: a single module – a seed with its pappus – is repeated to produce the recognisable form of the whole.

Bubble Trees in the Clouds – ILCB, Texas A&M University, College Station, Texas, 2025

The *Bubble Trees in the Clouds* installation was commissioned by Texas A&M University and comprises a steel sculpture on the terrace of the Interdisciplinary Life Sciences Building (ILCB) together with a wall-mounted installation inside the building. Both are based on a concept developed during the creation of the *Bubble Forest* sculpture of 2019 (Struzik 2019). It is a unique composition in which the exterior sculpture is complemented by a wall element visible in the background behind the glazing (Figs. 3–5).

The contrast harmony between the organic morphology of the sculpture and the simple geometry of the architecture is here reinforced by the visual reduplication of the form in the repeated reflections across the glass façades surrounding the terrace. The same modular repetition governs both the free-standing terrace sculpture and the graphic element on the interior wall. In the sculpture it takes the form of eleven recurring bubble structures, while on the wall the motif is reproduced in graphic form.

Jellyfish Shrub
– Academia Sinica Campus South,
Tainan, Taiwan, 2024

Jellyfish Shrub is a realisation commissioned by Academia Sinica, Taiwan's foremost research institution (Struzik 2024). The project was designed specifically for a site adjacent to a plant biology research centre, where experimental greenhouses and a body of water are situated. The form of the sculpture references the process of photosynthesis and is inspired by the production of oxygen by plants, including aquatic species. The concept unites art and science in the context of the biological sciences department (Figs. 6–8).

The compositional effect is enhanced by a dynamic RGB lighting system that transforms the static sculpture into a dynamic spectacle after sunset. The same modular principle governs the work – the bubble form recurs throughout the sculpture – but here it also operates in the relationship between the installation and its surroundings. This is particularly evident at night, when the illuminated sculpture is reflected in the glass walls of the surrounding greenhouses and in the surface of the water.

Photovoltaic sculpture concepts

The combination of art and technology opens up possibilities for exploring serial composition through sculp-



Fig. 1. *Dandelions*, 2017, Burj Khalifa, Dubai, daytime view
(photo by M. Struzik)

Il. 1. *Dandelions*, 2017, Burj Khalifa, Dubaj, widok dzienny (fot. M. Struzik)

tures that serve extra-artistic functions. The integration of photovoltaic cells into the structure of the work creates modular agrivoltaic installations capable of powering their own lighting or generating energy for the surrounding area.

Fig. 2. *Dandelions*, 2017,
Burj Khalifa, Dubai,
nighttime view
(photo by M. Struzik)

Il. 2. *Dandelions*, 2017,
Burj Khalifa, Dubaj,
widok nocny
(fot. M. Struzik)





Fig. 3. *Bubble Trees in the Clouds*, 2025, ILCB, Texas A&M University, College Station, TX, daytime view (photo by M. Struzik)

Il. 3. *Bubble Trees in the Clouds*, 2025, ILCB, Texas A&M University, College Station, Teksas, widok dzienny (fot. M. Struzik)



Fig. 4. *Bubble Trees in the Clouds*, 2025, ILCB, Texas A&M University, College Station, TX, nighttime view (photo by M. Struzik)

Il. 4. *Bubble Trees in the Clouds*, 2025, ILCB, Texas A&M University, College Station, Teksas, widok nocny (fot. M. Struzik)



Fig. 5. *Bubble Trees in the Clouds*, 2025, ILCB, Texas A&M University, College Station, TX, wall art part of the installation (photo by M. Struzik)

Il. 5. *Bubble Trees in the Clouds*, 2025, ILCB, Texas A&M University, College Station, Teksas, element naścienny instalacji (fot. M. Struzik)

Photovoltaic sculptures demonstrate that green energy can contribute to an attractive urban landscape, offering alternatives to conventional rooftop panels. Installations designed in the spirit of agrivoltaics can support water retention in the soil and the biodiversity of flora and fauna by limiting the exposure of the ground to direct radiation.

- *Solar Butterflies*, 2012

Solar Butterflies is a modular, infinitely repeatable sculpture project developed by Mirosław Struzik, Tadeusz Zdaniowicz and Tomasz Pultowicz. The project was created as part of a competition for the revitalisation of former port areas in New York and was subsequently developed to the stage of a commercial product ready for implementation. The concept envisages deployment either as a single element or as a fractal composition scaling to larger areas. As a product of this type, *Solar Butterflies* is designed for installation in larger groups, where the repeated form creates the effect of a flock of butterflies. The project was recognised at the Land Art Generator Initiative 2012 competition (Land Art Generator Initiative 2012) (Fig. 9).

- *Solar Poplars*, 2022

Solar Poplars is a product line concept for photovoltaic panels inspired by the morphology of the poplar tree, developed in collaboration with ASCA and JBG by Mirosław Struzik, Jakub Skowron, Hafis Hermann Issa and Olivier Portier. The system constitutes a discreet agrivoltaic installation ready for deployment, which can be incorporated into existing urban energy systems and serve practical functions (enhancing biodiversity, noise attenuation) as well as educational and informational ones – presenting to the public new possibilities for the application of photovoltaic solutions in ways that do not compromise the aesthetics of the urban fabric. *Solar Poplars* was conceived for mass installations, where groups of repeated modules form a solar forest. The project was recognised at the Land Art Generator Initiative 2022 competition (Land Art Generator Initiative 2023) (Fig. 10).

Limitations, criticism and risk

A reflection written by the author of the works it discusses cannot claim full critical distance, and none is asserted here. It is nonetheless possible – and, for an honest account of the practice, necessary – to set out the constraints, hazards and points of friction that condition monumental public sculpture, independently of any aesthetic judgement of the individual works.

Constraints

Large-scale public installations are realised inside a dense framework of regulation and physical limitation. Legal and administrative requirements are frequently demanding: contracting with a public authority in the United States, for example, may require a foreign company first to obtain a Certificate of Authority to Transact Business in the relevant state – a registration granted only after rigorous procedures before the state corporation commission, a require-



Fig. 6. *Jellyfish Shrub*, 2024, Academia Sinica Campus South, Tainan, daytime view (photo by J. Skowron)

Il. 6. *Jellyfish Shrub*, 2024, Academia Sinica Campus South, Tainan, widok dzienny (fot. J. Skowron)

ment the author encountered when contracting with a public client in Virginia. Projects involving cast foundations in the ground typically require a building permit. Structural codes vary sharply by location: some jurisdictions (Taiwan among them) prescribe the wind speeds a sculpture must withstand, others the seismic forces it must resist. Durability requirements form a further category of constraint: clients frequently demand that a sculpture withstand harsh atmospheric conditions, and contracts often stipulate that the work must retain its original appearance for a minimum of twenty years. The author's response to this requirement is material: the most durable materials available are used, which in the majority of his sculptures means 316L stainless steel. Proximity to airports brings strict limits on upward-directed lighting. Pedestrian circulation must always be accounted for – the Dubai *Dandelions*, for instance, stand in a setting through which some ninety-four million visitors pass each year – which in turn dictates that sharp edges be kept above reach and that forms be shaped so as not to invite climbing. These constraints are not incidental: they shape the work from the concept stage onward.

Reception

Public art always carries the risk of adverse public reception. In the present practice no serious criticism of this kind



Fig. 7. *Jellyfish Shrub*, 2024, Academia Sinica Campus South, Tainan, daytime view (photo by J. Skowron)

Il. 7. *Jellyfish Shrub*, 2024, Academia Sinica Campus South, Tainan, widok dzienny (fot. J. Skowron)



Fig. 8. *Jellyfish Shrub*, 2024, Academia Sinica Campus South, Tainan, nighttime view (photo by J. Skowron)

Il. 8. *Jellyfish Shrub*, 2024, Academia Sinica Campus South, Tainan, widok nocny (fot. J. Skowron)

has been encountered, a circumstance the author attributes less to chance than to a deliberate choice of subject matter: the works draw on universal natural motifs – flora, growth, light – that are legible and positively received across cultural contexts, and they deliberately avoid contentious themes. This is a curatorial position rather than an avoidance of difficulty, and it is consistent with the placemaking objectives set out at the outset.

Risk

Two principal sources of risk attend monumental public commissions. The first is engineering risk: the possibility

that an artistic vision expressed in sketches proves impossible to realise as drawn – because the structure would not stand, or because of the limits of available technology – so that concept and feasibility must be reconciled through close work with engineers. The second is commercial risk, structural to international practice rather than particular to any one project: delayed or defaulted client payment, and exposure to currency movements. The pronounced fall of the US dollar against the Polish złoty over the past year, for example, materially eroded the economics of work for American clients, especially on commissions priced before the shift. Such risks are inherent to the field, and managing them is part of the discipline of public sculpture.

Fig. 9. *Solar Butterflies*, three variations – concept rendering (modelled in 3D and rendered by T. Pultowicz)

Il. 9. *Solar Butterflies*, trzy warianty, render koncepcyjny (modelowanie 3D i renderowanie: T. Pultowicz)



Fig. 10. *Solar Poplars* – concept rendering (modelled in 3D and rendered by T. Pultowicz)

Il. 10. *Solar Poplars*, render koncepcyjny (modelowanie 3D i renderowanie: T. Pultowicz)



Conclusions

The analysis of the realisations and concepts discussed above makes it possible to identify three principal mechanisms by which forms are multiplied in Struzik's work.

First, the scaling of natural motifs – the transposition of organic forms (dandelions, bubbles, jellyfish) from the micro to the macro scale, which generates an effect of cognitive surprise and builds a harmonious contrast with the geometric architecture of the surroundings.

Second, fractal modular replication – the design of elements as units capable of being repeated and scaled in compositions of varying size. This mechanism is visible across all the works discussed: in the *Dandelions* flowers composed of repeated seeds, in the eleven recurring bubble structures of *Bubble Trees in the Clouds*, in the modular bubbles of *Jellyfish Shrub*, and in the photovoltaic concepts – in the flock of *Solar Butterflies* and the solar forest of *Solar Poplars*.

Third, perceptual multiplication – the deliberate use of the properties of the surroundings (glass façades, water surfaces, building glazing) as a medium for the optical replication of the sculpture. This mechanism is particularly

pronounced in the *Bubble Trees in the Clouds* and *Jellyfish Shrub* realisations, where reflections in glass façades and on the water surface, intensify the impact of the composition, especially after dark.

In every case examined, this replication serves the principle of contrast harmony: the organic, biomorphic forms of the sculpture contrast with the linear geometry of the architecture, and their recurrence amplifies this effect, making the sculpture the dominant compositional accent of the space.

Summary

The multiplication of forms constitutes a coherent and consistently applied design strategy in the work of Mirosław Struzik. This strategy evolves from purely aesthetic applications (*Dandelions*, *Bubble Trees*) towards solutions integrating utilitarian functions (*Solar Butterflies*, *Solar Poplars*), signalling the potential of public sculpture as a vehicle for sustainable development technology.

Translated by
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References

- CODAworx. *CODAreview 2025: The Power of Public Art – Data, Economic Growth, Policy, and Placemaking*. CODAworx, 2025.
- Frazier Britt, Meredith. “The Intersection of Public Art and City Planning.” *Americans for the Arts Blog*. Published September 4, 2014. Accessed September 15, 2025, at <https://blog.americansforthearts.org/2019/05/15/the-intersection-of-public-art-and-city-planning>.
- Krauss, Rosalind E. *Passages in Modern Sculpture*. Viking Press, 1977.
- Krauss, Rosalind E. “Grids.” *October* 9 (Summer 1979): 50–64.
- Land Art Generator Initiative. “Butterfly.” *Land Art Generator Initiative*, 2012. Accessed September 23, 2025, at <https://landartgenerator.org/LAGI-2012/ms071256/>.
- Land Art Generator Initiative. “The Solar Poplars.” *Land Art Generator Initiative*, 2023. Accessed September 23, 2025. <https://landartgenerator.org/LAGI-2022/2023/03/01/the-solar-poplars/>.
- McClimon, Timothy J. “The Economic Impact of Local Arts and Culture Businesses.” *Forbes*, October 16, 2023. Accessed September 15, 2025, at <https://www.forbes.com/sites/timothyjmcclimon/2023/10/16/the-economic-impact-of-local-arts-and-culture-businesses/>.
- Mikuni, Jan, Margot Dehove, Linda Dörzapf, et al. “Art in the City Reduces the Feeling of Anxiety, Stress, and Negative Mood: A Field Study Examining the Impact of Artistic Intervention in Urban Public Space on Well-Being.” *Wellbeing, Space and Society* 7 (2024): 100215. <https://doi.org/10.1016/j.wss.2024.100215>.
- Polat, Bengi, and Şebnem Gökçen. “Public Art and Percent for Art Strategy: Evaluation of Selected Western Cities and Possible Scenarios for the Case of Izmir-Turkey.” *Prostor* 30, no. 2 (2022): 188–99. [https://doi.org/10.31522/p.30.2\(64\).5](https://doi.org/10.31522/p.30.2(64).5).
- Spehar, Branka, and Richard P. Taylor. “Fractals in Art and Nature: Why Do We Like Them?” In *Proceedings of SPIE 8651. Human Vision and Electronic Imaging XVIII. 865118*. SPIE, 2013. <https://doi.org/10.1117/12.2012076>.
- Struzik, Mirek. “Dandelions Dubai.” *Struzik Art*. Published 2017. Accessed September 23, 2025, at <https://struzik-art.com/en/project/dandelions-dubai>.
- Struzik, Mirek. “Bubble Forest.” *Struzik Art*. Published 2019. Accessed September 23, 2025, at <https://struzik-art.com/en/project/bubble-forest>.
- Struzik, Mirek. “Jellyfish Shrub.” *Struzik Art*. Published 2024. Accessed September 23, 2025, at <https://struzik-art.com/en/project/jellyfish-shrub>.
- Taylor, Richard P. “Reduction of Physiological Stress Using Fractal Art and Architecture.” *Leonardo* 39, no. 3 (2006): 245–51.
- Trupp, MacKenzie D., Claire Howlin, Anna Fekete, Julian Kutsche, Joerg Fingerhut, and Matthew Pelowski. “The Impact of Viewing Art on Well-Being – A Systematic Review of the Evidence Base and Suggested Mechanisms.” *The Journal of Positive Psychology* 20, no. 6 (2025): 978–1002. <https://doi.org/10.1080/17439760.2025.2481041>.
- UNESCO. *UNESCO Framework for Culture and Arts Education*. UNESCO, 2024. Accessed September 15, 2025, at https://www.unesco.org/sites/default/files/medias/fichiers/2024/02/WCCAE_UNESCO_Framework_EN_0.pdf.

Streszczenie

Multiplikacja form przestrzennych w sztuce Mirosława Struzika

Sztuka publiczna jest uznanym narzędziem planowania urbanistycznego, służącym kształtowaniu miejsc, humanizacji przestrzeni oraz marketingowi destynacji. Artykuł analizuje jedną ze strategii projektowych stosowanych we współczesnej rzeźbie monumentalnej: multiplikację form przestrzennych, rozumianą jako celowe powielanie modułowych elementów kompozycyjnych w celu osiągnięcia efektów estetycznych, percepcyjnych i funkcjonalnych. Tekst, napisany z perspektywy praktyki twórczej, stanowi refleksję nad zrealizowanymi projektami publicznymi Mirosława Struzika – *Dandelions* (Dubaj, 2017), *Bubble Trees in the Clouds* (College Station, 2025) i *Jellyfish Shrub* (Tajwan, 2024) – a także dwiema koncepcjami rzeźb fotowoltaicznych: *Solar Butterflies* (2012) i *Solar Poplars* (2022). Analiza sytuuje omówioną strategię na przecięciu serialnej logiki rzeźby nowoczesnej oraz badań nad biofilnym oddziaływaniem powtarzalnych form organicznych, wyróżniając trzy mechanizmy operacyjne: skalowanie motywów naturalnych, fraktalną replikację modułową oraz multiplikację percepcyjną poprzez refleksyjne otoczenie. Omówiono również ograniczenia, odbiór i ryzyko właściwe monumentalnym realizacjom publicznym. Trajektoria omówionych prac wskazuje na ewolucję od zastosowań czysto estetycznych ku rzeźbom integrującym funkcje użytkowe, generujące energię.

Słowa kluczowe: sztuka publiczna, rzeźba monumentalna, multiplikacja form, modularność, agrowoltaika, placemaking