

PROCEEDINGS OF THE PERFORMING SPACE 2023 CONFERENCE

(2026)

PERFORMANCE & SPACE III. PROCEEDINGS OF THE PERFORMING SPACE 2025 CONFERENCE

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PERFORMANCE & SPACE III

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PERFORMING SPACE 2025 CONFERENCE



Performing Space Association

University of the Peloponnese

2026

Bubble Ecologies: Interstitial Worlds of Performance and Growth

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doi: [10.12681/ps2023.9938](https://doi.org/10.12681/ps2023.9938)

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**Bubble Ecologies:
Interstitial Worlds of Performance and Growth****Miljana Zeković**Department of Architecture and Urban Planning, Faculty of Technical Sciences,
University of Novi Sad**Abstract**

This paper examines *Terram Intelligere: INTERSTITIUM*, Montenegro's contribution to the 19th International Architecture Exhibition of La Biennale di Venezia, as a performative rethinking of architectural space. Developed through an interdisciplinary collaboration between curatorial practice and scientific research, the project engages soil and microbial life as active material agents. By embedding living ecosystems within translucent architectural forms — bubbles — the pavilion proposes space not as a static object but as an interstitial process: dynamic, adaptive, and co-created across human and non-human scales. Drawing on theories of performativity and ecological design, the paper situates the project within contemporary architectural discourse, challenging traditional notions of form, authorship, and materiality. *Terram Intelligere* offers an alternative model of practice, one grounded in relational ecologies, slow transformation, and hybrid intelligence. In doing so, it invites us to reconsider how we inhabit and build with, rather than on, the living systems of the land.

Keywords: interstitium; microbial design; ecological performativity; material agency; hybrid intelligence

Bubble Ecologies

Across the history of architecture, space has largely been imagined as something stable and complete — an enclosure for human presence rather than a living field of relations. However, recent theoretical movements have challenged this static model, proposing instead that space is performative — an active, contingent process co-produced through the relations between bodies, materials, and environments. Thinkers such as Henri Lefebvre, Tim Ingold, and Andrew Pickering have articulated space as something enacted and continually negotiated, dissolving the boundaries between design, occupation, and ecological processes.

This paper takes up these questions through *Terram Intelligere: INTERSTITIUM* — Montenegro's contribution to the 19th International Architecture Exhibition of La Biennale di Venezia — curated by Miljana Zeković in collaboration with Ivan Šuković, Dejan Todorović, and Emir Šehanović (Đurišić & Zeković, 2025). Located in the newly inaugurated Arte Nova Gallery at Campo San Lorenzo, Venice, the exhibition extends the Biennale's broader curatorial theme — “Intelligens. Natural. Artificial. Collective.” by Carlo Ratti — through an exploration of intelligence as both ecological and collective. Developed at the intersection of scientific research and curatorial practice, *Terram Intelligere* situates microbial life as an architectural agent, embedding living systems within polycarbonate structures that grow, adapt, and transform over time. By framing the installation as both environment and experiment, the project resists the objecthood of traditional architectural exhibition and instead stages space as a living, performative ecology.

Located slightly away from the Biennale's primary venues, the pavilion offers an atmosphere of quiet dislocation and reflective slowness. Visitors move through a dimly lit, graphite space, punctuated by clusters of soil samples and translucent enclosures, their movement slowed to match the imperceptible rhythms of microbial life. In this setting, *Terram Intelligere* invites not only aesthetic observation but also temporal recalibration — a way of dwelling that foregrounds attention, care, and responsiveness.

Theoretical Framework

The notion that architecture should be understood less as a static object and more as an active process has been central to architectural discourse for several decades. Influenced by developments in process philosophy (Whitehead, 1929), actor-network theory (Latour, 2005), and performance studies (Schechner, 1985; Pearson, 2010), theorists and practitioners have increasingly framed architecture as an event, a situation, or a field of relations. Figures such as Bernard Tschumi (1996), Peter Eisenman (2004), and Jane

Rendell (2006) have interrogated the fixed nature of architectural form, proposing instead a view of space as dynamic, relational, and emergent.

This shift has opened architecture to the temporalities of occupation and use, emphasising the performative dimension of space. However, much of this discourse remains anthropocentric, centring on human bodies, actions, and temporal frameworks. By contrast, emerging ecological and posthumanist theories of space call for an expanded notion of performativity that considers the agency of non-human actors, materials, and ecosystems. As Pickering (2013, pp. 79-80) notes, environments are not inert contexts but active participants in ongoing, co-constitutive processes. Bennett (2010), Haraway (2016), and Barad (2007) likewise articulate frameworks in which vitality and agency are distributed across species and materials, inviting architecture to operate as part of this “dance of agency.”

Figure 1

“Suvomeđa” — A dry-stone structure built in the land. (photo © Jovan Milošević).



Within this context, *Terram Intelligere: INTERSTITIUM* positions itself as a site of co-creation. The concept of the interstitium, borrowed from molecular biology to denote the space between cells (Benias et al., 2018, p. 1), becomes an operative metaphor and material method. The interstitial is not a void or a gap but a living tissue of exchange and transformation, a porous field through which energy and communication flow. In the Montenegrin pavilion, this notion resonates with the traditional “međa” or dry-stone

boundary, which has been recognised by UNESCO (n.d.) as part of the intangible cultural heritage of humanity. The “međa” delineates ownership yet remains porous: a wall built without any binding material that allows air, seeds, and organisms to pass through, hosting moss, fungi, and microbial life. As Zeković (2024) and Zanini (2002) observe, the boundary is both division and connection, a liminal threshold of negotiation and coexistence. Translating this cultural construct into architectural thought, the pavilion reimagines the interstitium as a spatial and ethical framework for shared inhabitation.

By embedding bacterial ecosystems within architectural forms, *Terram Intelligere* proposes a performativity that extends beyond the human. Architecture becomes an evolving ecology of matter, energy, and life — less a stage for human action than a continuous, multispecies negotiation. This move towards interstitial performativity opens new possibilities for practice in an era of environmental fragility and hybrid intelligence (Sarantou et al., 2025).

Case study: Terram Intelligere – INTERSTITIUM

Terram Intelligere unfolds as an installation in which architectural form operates as an active site of biological performance. Rather than being a finished exhibit, it is a living laboratory where microbial systems inhabit translucent polycarbonate structures, transforming in response to environmental stimuli. The project draws on soil samples collected from diverse ecological sites across Montenegro, focusing on *Streptomyces*—organisms renowned for their biosynthetic capacities. In collaboration with the Institute of Molecular Genetics and Genetic Engineering in Belgrade, the team cultivated microbial colonies that respond dynamically to light, humidity, and temperature by producing vivid bio-pigments and intricate spatial formations. These formations emerge autonomously, revealing a material intelligence that mirrors the ecological processes of the land itself. The installation thus becomes a conversation between biological agency and architectural intention, where design operates not through control but through attunement to living systems. Over time, the structures accumulate traces of environmental change, becoming temporal records of microbial adaptation and atmospheric fluctuation.

The installation’s spatial strategy extends the logic of interstitiality. Polycarbonate bubbles act as semi-permeable membranes — thresholds mediating exchanges between microbial interior and gallery atmosphere. Visitors are invited to experience a slow, durational encounter with growth, decay, and transformation, observing how colour intensities deepen and textures shift over the course of the exhibition. In this slow temporality, the project rejects spectacle and embraces what Zeković (2024) terms an “ecology of attention” — a mode of curatorial care that privileges observation, patience, and

reciprocal engagement with more-than-human processes. The space encourages a form of embodied contemplation, where perception is recalibrated to the subtle temporalities of non-human life. Through this encounter, the viewer becomes part of the evolving ecology of the system, contributing to the delicate equilibrium of the environment through breath, presence, and attention.

The conceptual roots of the installation also lie in Montenegro's vernacular landscape. The "suvomeđa", or dry-stone structure, is a cultural artifact and an ecological mediator, a system that blurs the boundary between the constructed and the organic. Within *Terram Intelligere*, this vernacular knowledge becomes a framework for architectural speculation: the "međa" transforms into a network of suspended, translucent "bubbles," evoking a porous architecture of connection rather than separation. Here, soil, bacteria and structure converge into a shared medium of becoming — a tangible articulation of the interstitial as method and metaphor. Ultimately, the project extends this condition beyond material expression, suggesting a broader ethos of coexistence, where architectural practice becomes a means of fostering attention, resilience, and care within fragile ecological systems.

Figures 2 and 3

INTERSTITIUM—A swarm intelligence of polycarbonate bubbles in the Montenegrin pavilion, close-up and details. (ph © Ugo Carmeni).





Discussion: Performing Ecologies and Rethinking Practice

By embedding microbial life within architectural form, *Terram Intelligere: INTERSTITIUM* advances a vision of architecture as a co-productive ecology rather than a static artifact. The project disrupts conventional hierarchies of authorship and material control, shifting attention to the slow rhythms of non-human actors and their capacity to shape space over time. This approach corresponds with current trajectories in curatorial and architectural discourse that advocate for slower, care-driven, and contextually responsive modes of practice. Rather than a spectacle of design, the pavilion cultivates a reflective experience — an ethics of slowness that mirrors microbial temporality and environmental transformation. It repositions the act of designing as one of continuous tending rather than completion, where uncertainty becomes an operative condition and maintenance a creative gesture. Through this lens, architecture begins to perform as a medium of relation, an interface through which species, materials, and climates negotiate shared existence.

The interstitium, understood as both concept and process, reframes architecture as an active field of mediation, where flows, materials, and encounters continuously generate spatial significance. Applied to architecture, the interstitial becomes a performative field where multiple agencies — biological, material, cultural — interact. The “međa”, once a

symbol of division, becomes a living frontier of collaboration, where human and non-human systems co-author spatial and ecological forms. As Zanini (2002) suggests, the significance of boundaries lies not in separation, but in their generative potential for encounter. In this light, *Terram Intelligere* reveals how architectural performance can manifest as ongoing care and negotiation. It makes visible the subtle economies of exchange that sustain ecological balance, foregrounding process over form and responsiveness over resolution. The interstitial is thus not a void between things, but a vibrant connective tissue that continually reorganizes relations across scales, from the microbial to the territorial.

Figure 4

INTERSTITIUM constellation in the Montenegrin Pavilion. (photo © Ugo Carmeni).



This reframing aligns with broader theoretical currents that advocate distributed agency and material vitality (Barad, 2007; Bennett, 2010; Haraway, 2016; Pickering, 2013). It also engages with the “new material language” articulated by Sarantou et al. (2025), where digital and biological systems intertwine through hybrid ecologies of communication. The pavilion thus embodies not only a curatorial methodology but a speculative design ethics — one that listens to material intelligence, cultivates slow emergence, and embraces uncertainty as a condition of growth. In this sense, *Terram Intelligere* anticipates a future of architectural practice rooted in reciprocity, adaptation, and care, where designing becomes indistinguishable from living.

Conclusion: Towards an Interstitial Practice

Terram Intelligere: INTERSTITIUM proposes a shift in architectural thinking — from the production of static forms to the cultivation of living, relational ecologies. By working with microbial systems and reimagining space as a performative interstice, the project demonstrates how architecture can participate in multispecies entanglements rather than stand apart from them. This model challenges conventional notions of design authorship, material agency, and temporality, calling for an architecture that listens, adapts, and evolves.

In refusing the spectacle of resolved form and embracing the contingency of living systems, *Terram Intelligere* gestures towards new modes of practice grounded in care, interdependence, and co-creation across species boundaries. It also contributes to broader disciplinary conversations on ecological design by articulating an architectural methodology that operates through observation, experimentation, and sustained engagement with non-human processes. The pavilion thus functions as both a curatorial experiment and a theoretical proposition — an argument for architecture as a living medium of communication and exchange.

It suggests that architecture may no longer be what we build upon the earth, but what we grow with it: a living membrane where multiple forms of intelligence and life converge. Through its synthesis of scientific research, curatorial sensitivity, and cultural continuity, the pavilion invites us to imagine futures where architecture, ecology, and performance converge within the interstitial spaces of coexistence. Ultimately, its contribution lies in reframing architecture as a practice of ecological reciprocity — one that transforms care, slowness, and relational attention into the very fabric of design.

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