

The Missing Piece: Open Science Needs Open Infrastructure

Open science has transformed how we create and share knowledge. Researchers across the world can publish openly, share datasets, reproduce experiments, and collaborate across disciplines at an unprecedented scale.

Yet one critical gap remains.

Open science excels at sharing information, but it has no common framework for transforming that knowledge into living, evolving places that communities can build, measure, improve, and pass forward together.

I call this missing piece Growstruction.

Growstruction is an open-source framework for creating living infrastructure by integrating ecology, engineering, architecture, agriculture, forestry, mycology, water management, and community participation into a single adaptive system.

Instead of treating buildings as finished products, Growstruction treats them as living ecosystems.

A Growstruction project may include living tree structures shaped through pleaching, mycelium-based materials, regenerative soils, passive water harvesting, natural climate control, habitat restoration, food production, recycled materials, and long-term ecological monitoring. Each element is selected according to local climate, available resources, and community needs rather than a universal blueprint.

The most important innovation is not any individual technique.

It is the framework that connects them.

Every Growstruction project becomes an open scientific experiment. Communities document what succeeds, what fails, and why. Local observations become openly shared knowledge that other communities can adapt instead of simply copying. Each generation inherits not only a structure but an expanding body of evidence.

This creates a feedback loop similar to open-source software development.

One community improves a water management technique.

Another develops better living structural methods.

Another discovers new fungal or soil restoration practices.

Together these improvements become part of an openly shared ecosystem of knowledge that continually evolves.

One concept I believe deserves exploration is what I call a mycelium matrix.

Natural fungal networks distribute resources, respond to changing conditions, and connect diverse organisms without centralized control. Growstruction adopts this as both a biological inspiration and a systems model for open collaboration. Independent projects remain locally adapted while contributing observations to a larger network of shared learning. The result is distributed innovation instead of centralized design.

This approach also encourages interdisciplinary research. Engineers, ecologists, architects, soil scientists, foresters, microbiologists, data scientists, and local citizens all contribute different pieces of the same living system. Scientific knowledge becomes embedded within communities instead of remaining isolated in journals.

The potential applications extend far beyond housing. Growstruction principles could support affordable shelter, disaster recovery, ecological restoration, urban cooling, food security, carbon storage, biodiversity, watershed management, and public education. Because the framework is open, every project strengthens the next one.

Open science has already shown that knowledge grows faster when it is shared freely.

Growstruction asks a simple next question:

What if our homes, neighborhoods, and public spaces could grow the same way?

The missing piece is not another isolated technology.

It is an open framework that allows living infrastructure itself to become a collaborative scientific process.

By combining open science with regenerative design, communities around the world can build environments that are more resilient, more adaptable, and more capable of improving over time.

Knowledge should not stop at publication.

It should take root, grow, and become part of the world we live in.

Look me up on Facebook, YouTube, or Sea Soul.

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