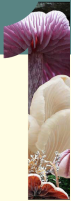




mykos  
菌丝体生态建筑

MYCELIUM VILLAGE PROJECT IN YUNNAN, CHINA



## CONCEPT

### ORIGINALITY

Mykos aims to be the first structural mycobrick eco-village in the world. It will be the first in China and in Yunnan, a province famed for its fungal biodiversity and knowledge of nutritional and medicinal edible mushrooms but which completely lacks a mycomaterials industry at this point. Made of bricks pressed from mycelium-processed agricultural waste, it models a new circular bioeconomy for this agricultural region and fungal hotspot.

## DESIGN

Design students from both Yunnan Arts University and UC Davis are responsible for creating the architectural design of the village, bricks and sealants, and prototypes of furniture, lighting and acoustic wall panels for the gallery, as well as the branding, signage, videos and website for Mykos. All aspects of our design work build upon colors, patterns and practices in Yunnan's traditional ethnic minority arts, architecture, and culture.

## SCIENTIFIC FEASIBILITY

Chris Maurer of redhouse studio architecture, along with partners, built MycoHAB Namibia last year. The strength of his bricks and their patented process showed the world the strength potential of mycelium-based composites (MBCs) that we all suspected was possible. Namibia is a desert region, whereas Yunnan contains a wide array of geographic regions from semi-tropical rainforests to the high mountain plateaus of the Himalayas. Because of this, UC Davis students have been experimenting with creating biobased sealants and other methods for increasing the hydrophobicity of MBCs. We are exploring different composite combinations and testing them for compressive strength, flexural bending, and flammability in both dry and humid conditions.

## CULTURAL

Yunnanese people are crazy about mushrooms; people all over China know this and travel there for mushroom-themed vacations. It has almost 900 known edible fungal species, and in some of the traditional rituals, mushrooms are revered and sacred. It also has a large mushroom farming economy, industrialized and at scale. We therefore believe it is an excellent, culturally-receptive location to introduce mycomaterials for architecture and design. Furthermore, everyone in Yunnan that we have shown samples to agrees.



## NARRATIVE

### VIDEO

Our 5-minute video succinctly explains how the project came about, what Mykos is, who the key collaborators and students are, and what research has been conducted to prepare for Mykos' realization in the near future.

## WEBSITE

UC Davis Design students have completely built the interactive Mykos website that comprehensively tells the story of the project to this point, as well as our goals for the future.



## REFLECTION

### PROCESS

We have accomplished so much together, but owing to time constraints, there are goals we did not achieve. We aimed to make enough bricks and samples for testing so that, at a minimum, we would have 5 samples each in order to be able to ascertain statistical relevance. That proved impossible, so we only had 1-2 samples for each test. Our outcomes are very promising, though, so we will continue some tests into the summer and fall in order to reach publication.



## SELF APPRAISAL

The language barrier and the time difference between the two universities meant that we had fewer zoom meetings than we had hoped. Many international collaborations face this challenge. It was important that YAU students took the lead on field work talking with villagers at the future Mykos site. UCD students were careful to learn about Yunnan's minority ethnic cultures, cognizant of and determined not to repeat patterns of colonialist capitalist interventions.



## CONTEXT

### HUMAN IMPACT

Yunnanese would be both the users and "nonusers/producers" of these materials. Throughout China, Yunnan has the highest concentration of traditional ethnic minorities (25 out of 55 total are in Yunnan). Traditional Yunnan people have lived in adobe or wood houses, farmed the land, and used fungi for food and medicine for millennia. Recent changes have introduced industrial farming at scale (including mushroom farming) and modern government-built housing from steel, concrete and glass, which lacks the natural feel of traditional Yunnanese architecture. We showed Yi (ethnic group) mushroom farmers mycomaterials and they are very excited to develop these materials, for economic revalorization of waste as well as cultural skill and love of mushrooms. Because mycelium-based design only works with edible, nonpathogenic species, producing it at scale is relatively healthy, especially if wearing personal protective equipment from dust, and already feasible. In July 2025, the faculty leading Mykos will be visiting a large-scale mushroom factory to better understand how mushroom farming works at scale there.

## ETHICS

We commit to developing sustainable Yunnanese Mykobricks in circular sources: local spent mushroom substrate, agricultural waste & species in the region. We let the Yunnanese people decide what materials and skills they want to adopt. These two important ethical principles are embodied in our slogan: "From Yunnan For Yunnan."

## SUSTAINABILITY

### ENVIRONMENTAL IMPACT

Mykos fulfills 8 out of the 17 United Nations Sustainable Development Goals (see other poster)

- |                                 |   |
|---------------------------------|---|
| 1 No Poverty                    | 9 Industry Innovation & Infrastructure  |
| 2 No Hunger                     | 11 Sustainable Cities & Communities     |
| 3 Good Health & Well-Being      | 12 Responsible Consumption & Production |
| 8 Decent Work & Economic Growth | 13 Climate Action                       |

## EFFICIENCY/LIFE CYCLE

Mykos mykobricks are made from agricultural waste that often in Yunnan is burned, a process that releases carbon and particulates into the air, spurring global warming. Instead of burning, spent mushroom substrate is pressed into bricks that function as carbon sinks, just as mycelium does within forest ecologies. The bricks are baked at 180 degrees Celsius for 4 hours, the most energy-intensive part of their life cycle. Mushroom farms exist all over Yunnan, so mykobrick fabrication happens locally and the bricks are utilized for local buildings, minimizing transportation. Once constructed into buildings (using carpenters glue for bonding), they need to be well-protected from the exterior elements, for example, covered with a well-maintained plaster and lime coating. Owing to their being a new material, we do not yet know how long these materials will last, but as a composite of wood and chitin, it has the potential to be long lasting. At the end of their useful life, mykobricks are biodegradable and compostable.

## RISK

### SAFETY

In fabricating MBCs, sometimes grinding up agricultural waste into particulates creates dust, so wearing a mask and other personal protective equipment are advised, as is working with non-allergic substrate materials. Additionally, MBCs need to be made from edible nonpathogenic species that are completely killed at the end of their development prior to design usage, in order to not sporulate in human environments. We do not know MBCs susceptibility to insects or mold, but if they are kept dry and protected from the elements, they seem to be similar to wood-based materials. There is also the potential that living in a house made of mykobricks of a well-known medicinal species like Reishi may enhance good health (the opposite of "sick building syndrome" that some people experience in environments made from highly synthetic off-gassing materials).



## DUAL USE

Mykobricks may become a source of harm if they are created from pathogenic species or with substrates that are allergens to the people making or living in these spaces.