

# A Grain Of: Integrating a 3D Model with Audio Data as an Experimental Creative Method

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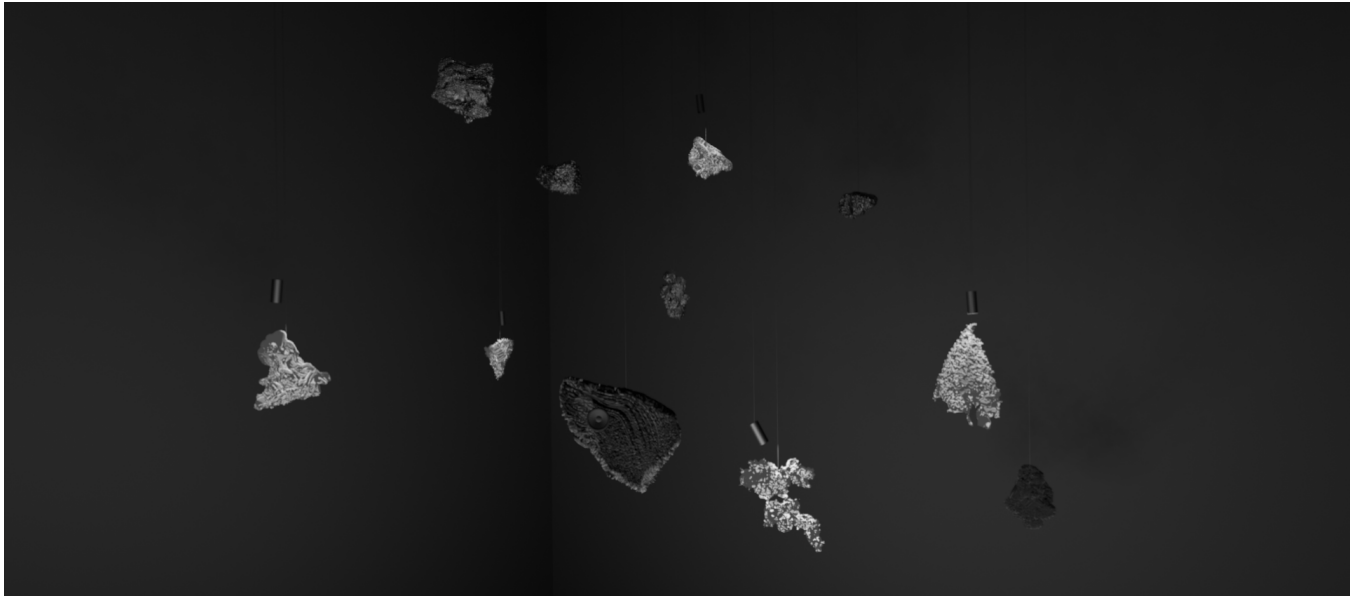


Figure 1: Rendering of artwork and space.

## CCS CONCEPTS

• **Social and professional topics** → *Geographic characteristics*; • **Applied computing** → **Media arts**; **Fine arts**; **Sound and music computing**.

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## 1 DESCRIPTION/ARTIST STATEMENT

A Grain Of is a data materialization project which represents a systematic experimental multimodal visualization of the hybrid city ecology of Shenzhen. At the exhibition, it is presented as a multi-media installation that features a series of 11 hanging 3D artifacts with topographical surface texture. Each of the hanging objects represents a collected fieldwork sample that has undergone a computational process; their 3D models – gained from 3D scanning of the samples – have been extended with a surface texture gained from the spectrogram of its environmental audio data at the found location, and the material properties are, as an audio recording, playing from loudspeakers that are integrated into 5 out of the 11 artifacts.

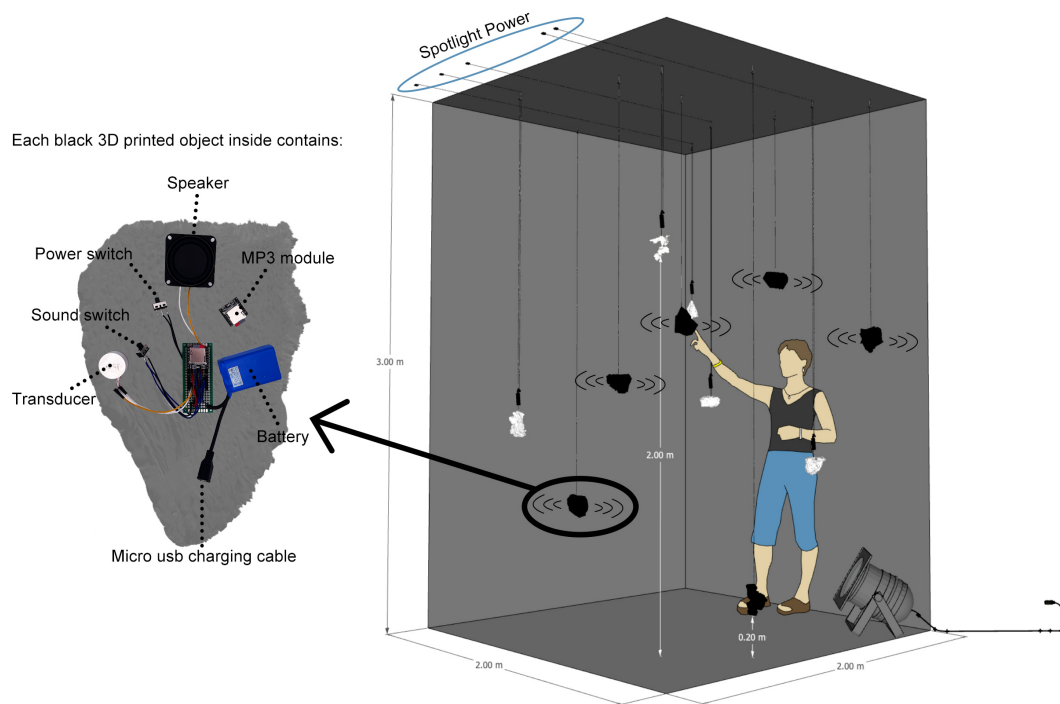


Figure 2: Technical plan.

The artists use “data materialization” as a method, adopted from Jansen et al. [2015] in a similar way to how they define “physicalization” [1]. What we embrace is the design-oriented approach which negotiates data statistics with symbolic, metaphorical, historical, and emotional values. Then this concept has been used to design the sensory-driven space of our installation, as a prototype of the urban vision we explore.

Technically, the artifacts are made by an idiosyncratic process that combines the digital with the tangible, proposed by the authors in an accompanying paper at VINCI’24. In this method, found samples get 3D scanned, their models get re-meshed, audio data from the found location is filtered, analyzed for human activity, then converted to a spectrogram. The monochromous spectrogram is wrapped around a UV map, where louder activity in sound creates higher peaks in the surface texture. This surface texture is then wrapped around the 3D model. The computationally processed artifacts are then 3D printed, made tangible again, and extended in the inside with small electronics circuitry that produce sound and vibration. This process is abstract, as our priority is not the direct conveying of information, but rather the creation of a sensory engagement with the city data.

This artistic data materialization project is inspired and initiated by the urban ecologies we live in, on the example of Shenzhen, where nature, humans, and technology intersect to construct the contemporary urban scape. The materials we collected during the eight-week fieldwork prove this hybridization in visible, aural, and haptic ways. Each piece of material in this city contains traces of natural as well as industrial-technological processes, and they can tell us metaphorically the story of how it has been shaped over a

long time span by different forms of human activity. “A Grain Of” renders this process of hybridization perceivable.

In the exhibition, the visitors engage with this assemblage of 11 hanging artifacts – and what is particular for our choice of display is that they encounter these hanging, city-based data materializations on eye- and ear-level, allowing for a corporeal, sensory experience rather than a museum-like situation where exhibits are normally behind glass vitrines and not meant for direct bodily engagement. What is produced is a multi-sensory experience that includes visual, auditory, and haptic modalities to create a hybridized immersive space.

## REFERENCES

- [1] Yvonne Jansen, Pierre Dragicevic, Petra Isenberg, Jason Alexander, Abhijit Karnik, Johan Kildal, Sriram Subramanian, and Kasper Hornbæk. 2015. Opportunities and Challenges for Data Physicalization. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*. ACM, Seoul Republic of Korea, 3227–3236. <https://doi.org/10.1145/2702123.2702180>