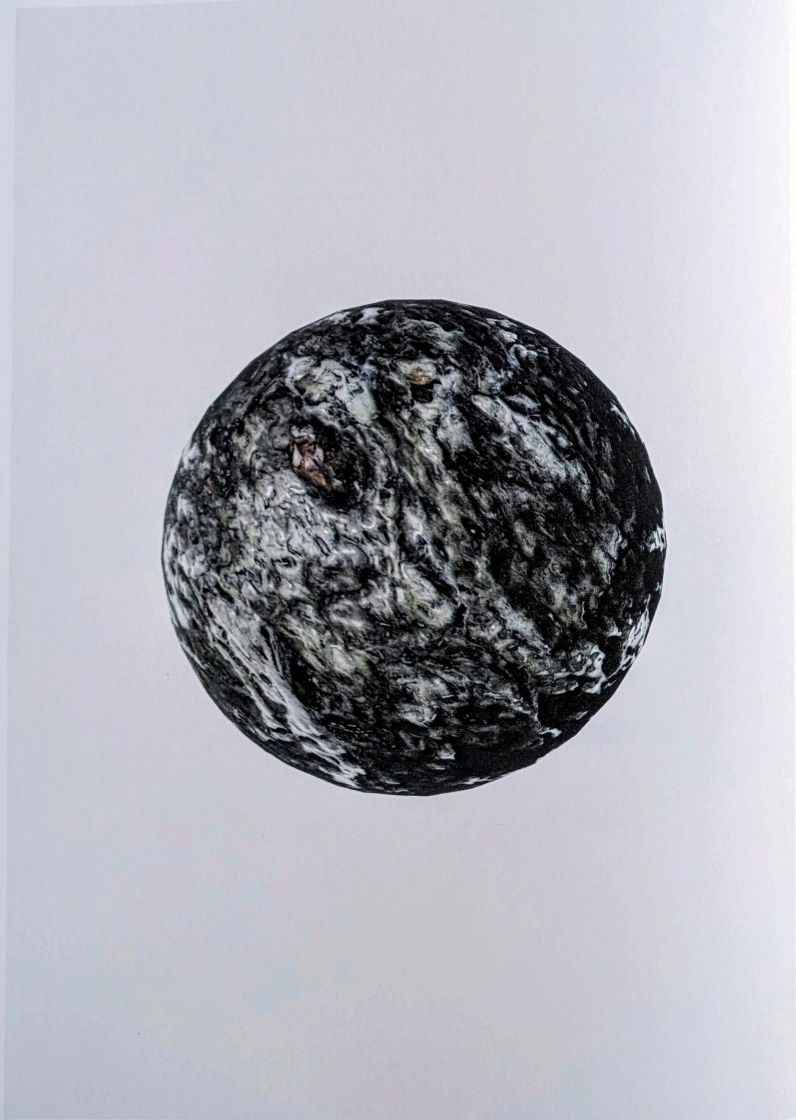




Josefin Tingvall
Tumbling Worlds





Tumbling Worlds — 3D material made from tumbled dishcloth, melted snow, museum tickets, and road gravel — February 2024

Josefin Tingvall Tumbling Worlds

Something poetic in the Normal-map: an artistic exploration of 3D-materiality

In this text I reflect on working between physical creation, 3D-materials, and the making of game environments from the process of the project *Tumbling Worlds*. *Tumbling Worlds* is an exploration of material change and digital world creation. By simulating decomposing and fragmenting systems of wind, water, and movement using a stone tumbler, site-specific things and materials are mixed and worn against each other. The result of the project is a physical and digital material library containing the tumbled materials together with virtual game environments.

The virtual is all around us, created in computer systems, shared through a plentiful of screens and housed in hard-drives and server halls; it is part of our physical reality, yet, at the same time, is used in simulations, design processes and storytelling about real, imaginative or planned anything to come. The virtual visually builds on our experiences and senses, like a side note to reality it strives to recreate and mimic the physical world around us or give a visible hint of physical forms to the alien and unknown. Game development programs such as *Unity* and *Unreal Engine* have, in the last seven years, strived for rendering in real-time, which opens up the field of working with simulations and virtual creations for creators from different fields with so-called visual coding.¹ This development has meant that I, as an artist from the field of textile arts, have opened my eyes to the virtual as an expansive narrative tool about material processes. Photo-based graphics and 3D-materials have become a way of addressing larger contexts and inviting unseen angles. For example, the project *Tumbling Worlds* builds open-world game environments from small amounts of reimagined remains of everyday matter and materials, engaging with my own speculation in a time of environmental collapse and multiple climate urgencies.

A game environment consists of an extensive system of files and folders connected in the virtual creation program. The photo-based way of doing 3D-materials (PBR/Photo Based Renderings) that I work with consists of several image files as layers that together form the visual surface of the 3D-material. The combined layers describe the colours, texture and functions a 3D-material has. With a distinct difference from the physical world, which has heavy stones, unravelling fabric, and solid wood, 3D-objects are only thin shells of shape (mesh) and image (PBR-material) that remind viewers about physical qualities in the virtual world. PBR materials consist of at least three to four texture images; the most important are a Texture-map and a Normal-map. The Texture-map is a square digital image of the physical material you want to make in 3D; it forms a base from which the other texture layers are generated in computer programs. A Normal-map is an image whose colour spectrum is a way of describing different qualities of textures; for example, the shape of a rounded rock is made with a mesh, but the rough and rugged surface is made with a Normal-map in the 3D-material.²

In 1978, Normal-maps was described by James F. Blinn in the essay *Simulation of wrinkled surfaces* as an emerging way of making realistic-looking textures on 3D-materials without sculpting the underlying 3D-object and, therefore, saving processing power. Each colour pixel in a Normal-map describes how the light in the game world should treat the surface and bend its normals. The blue tone that is the most common to see in Normal-maps indicates in the virtual world that the material of the surface should be illuminated in direct light. Through a relief of nearby colour tones, it gives a believable materiality back to the 3D-object, letting us believe that there might be something more than an image wrapped around a form.³ I began to think of Normal-maps as a painting intended for the game program that, in an embedded way, became a less visible building-block in the virtual world, yet with great importance in creating surfaces and thinking about materials.

During the project *Tumbling Worlds*, I started physically drafting all the files in the virtual environments by hand, from sketching shapes of 3D-objects cut out from tarpaulin to hand-painting texture layers in acrylic. It became a way to reflect on the virtual and my relationship to the changed materiality of my possessions, but it also revealed the underlying systematics of building virtual environments. The 3D-materials I made became a type of hybrid where the layers were no longer computer-perfect made for each other, but instead turned into an in-between based on my actions. They became a meeting point between the tumbled surface, sponge strokes of acrylic paint, my hand movements and my perception of materials and textures.

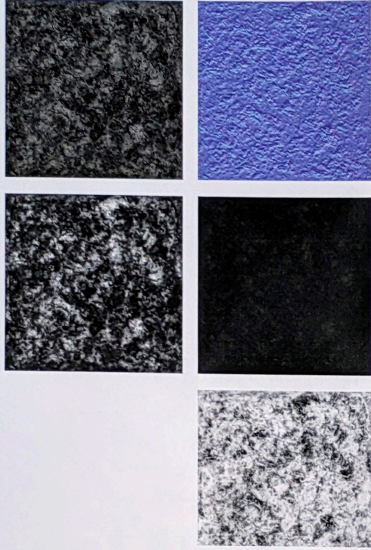
There is a space in art to follow and think beyond the systems created by industries and institutions. This experimental type of PBR-material is not aimed at photorealism, for which the technique was initially developed. Instead, it is an artistic space of *speculative materiality*. For example, the Normal-maps became an embedded way of describing the material with my experiences, memories and thoughts. By working within and against the typical colour space of the Normal-maps and letting unconventional colours, like black, introduce an unexpected play of light into the 3D-material, the virtual environment became a place for what I describe as 'material poetics'. In the ever-changing light, during the final hours of dusk and dawn without direct sunlight, the 3D-materials on ground foliage and scattered rocks momentarily glow and show a glimpse of my memories of what they once were. From flowery doodles in remembrance of the pattern on my coffee cup, to the knitted surface of a reusable blue dish cloth, a poetic note emerges in the blueprint visual code.

1 — Henrik Jensen and Tomas Akenine-Moller, "The Race for Real-Time Photorealism," *American Scientist* 98, no. 2 (2010): 132. <https://doi.org/10.1511/2010.83.132.98>.

2 — Jensen and Akenine-Moller, 4.

3 — Blinn, James F. 1978. "Simulation of Wrinkled Surfaces." *Computer Graphics* (New York, N.Y.) 12 (3): 286–92. <https://doi.org/10.1145/965139.507101>.





Tumbling Worlds — computer-made textures for the 3D-material on the previous page — 2024

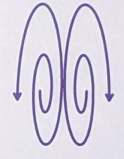
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Tumbling Worlds — floor installation overview of hand-painted textures, rock, lumber, the shape of 3d-objects and tumbled materials in various stages — 2024



Tumbling Worlds — image from process in Unreal Engine of development of virtual environments



Bio

Josefin Tingvall (b. 1993) is a multidisciplinary artist based in Gothenburg, Sweden. She holds a degree in craft and design from Linköping University and a Master in Fine Arts from Konstfack's Craft program. Her practice is rooted in a poetic and material enquiry into the dynamics, manipulation, and entanglements of objects and environments. Josefin has exhibited and participated in national and international artistic projects, and in 2021 she received Berit och Carl-Johan Wettergrens Stiftelse's educational grant. During her MFA in Fine Arts at Gothenburg University, she has focused on artistic research and speculative world-building, of which the project *Tumbling Worlds* is a part.

Project

Tumbling Worlds is a project about material change and speculative worldbuilding where objects and materials are mixed and worn by simulating decomposing systems of wind, water and movement with a rock tumbler. Through a parallel process of tumbling and making of game components, the project explores consumption culture's impact on the earth's changing environments and the artistic role of speculation in a time of climate urgencies. The result of the project is a collection of physical and digital materials formed into virtual environments, inviting viewers into a liminal place where memories, thoughts and associations about change interact. In April 2024, aspects of the project were exhibited at ADA Form Center Väst in central Gothenburg, where the full material library and a game world were displayed. *Speculative Gatherings* shares a video-loop installation from the game world and a participatory event.

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