

Composer's Note

Timbre and Spatial Expression in *Germinate* with Granular Reconstruction, Synth Design, and Dolby Atmos

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Abstract

The piece "Germinate" by Jiaying Quan is a work that traces the sensation of sprouting at night—a kind of growth that unfolds beneath visibility, where change is registered through shimmer, moisture-like motion, and gradual structural emergence rather than dramatic gesture. The piece is conceived as a continuous transformation of timbre and space. Its sound world is built from layered synthesis (primarily Serum, supplemented by Kontakt 7) and is continuously re-formed through granular reconstruction with Emergence. A set of sound-design processors—Spectral Gate, Fracture, Hysteresis, Renegade, Unfiltered Audio Lo-Fi-AF, and ReaEQ—is used not as decoration but as a way to control clarity, instability, texture, and articulation across the form. Spatially, the work is composed in Dolby Atmos, using Dolby Atmos Composer (fiedler audio) together with Dolby Atmos Beam Essentials, so that vertical placement, width, and object motion become part of the piece's narrative of growth.

1. Introduction

The word *germinate* implies an event, but the experience of germination is usually the opposite: it is a process, often silent and hidden, where motion is sensed as internal pressure, humidity, and the slow shift from potential to presence. *Germinate* begins from this premise. The work does not attempt to "paint" nature in a literal manner; instead, it seeks a balance between the concrete and the abstract, where sounds can suggest soil, dew, and upward movement while remaining fundamentally electronic and transformed. The composition therefore prioritizes micro-evolution over thematic repetition. Timbres are designed to behave like living matter—slightly unstable, continuously reorganizing, and capable of revealing structure only after time has passed.

2. Concept of the work

The conceptual center of the piece is the feeling of nighttime emergence. Darkness here is not emptiness, but a state in which perception changes: bright details become precious, movement is noticed through texture rather than

outline, and time seems to stretch. This leads to an aesthetic where sparkle is not glare, but distant glints; where flow is not dramatic sweeping motion, but subtle circulation; and where "organic" does not mean imitation of field recording, but rather sound behaviors that imply growth logic.

Formally, the work is shaped as a sequence of growth-states. It moves from an initial "seed" presence into phases that can be heard as birth, crisis, recovery, calm, upward expansion, nourishment, and finally a transition into a more unfamiliar sonic ecology—a "strange garden" where the abstract and the tangible coexist without resolving into a single image. Each state is defined less by melody or harmony than by the evolving relationship between density, brightness, and spatial height.

The piece opens with a delicate, shimmering timbre—an audible "seed" whose brightness is small but persistent. As the soundscape evolves, layers continuously change their skin: textures thicken, dissolve, and reorganize, tracing stages that can be felt as birth, threat, and recovery. The crisis phase is characterized by heightened density and time disturbance, where fragmentation and unstable echoes create pressure and uncertainty. From there, clarity returns gradually: the spectral space reopens, the foundational layer regains steadiness, and upward expansion becomes the dominant direction. In the later stages, the canopy of high-frequency detail grows richer, and object motion clarifies the sense of forward growth through space. The work concludes by entering a more unfamiliar sonic ecology—still rooted in organic logic, but no longer tied to a single image—suggesting that once growth becomes visible, it also becomes strange.

3. Sound Design and Processing

3.1. Thinking Through Low, Mid, and High Bands

The timbral strategy is organized through three frequency regions, treated as three layers of a single organism. In the low band, sound functions like soil and root: it is intentionally centered, cohesive, and kept free of unnecessary width so that the foundation stays clean and does not become cloudy. Rather than widening the bass for impact, the piece aims for solidity and intelligibility, allow-

ing subtle internal motion—small shifts of energy, gentle saturation, and controlled resonance—to communicate vitality without sacrificing clarity. ReaEQ plays a practical role here by removing unwanted accumulation and shaping the low region so that it remains firm even as the upper layers become more animated.

The mid band carries the body of the work. Pads and texture-layers are designed to feel humid and alive, as if matter is expanding in slow pulses. This is the region where timbre most clearly suggests “tissue,” because it can support both warmth and detail. Movement is introduced not through constant rhythmic activity but through evolving spectral emphasis and dynamic thresholds, which gives the impression that the sound is “condensing” and “releasing.” Spectral Gate is especially suited to this role: by shaping when and how partials become audible, it allows the midrange to breathe and to reveal form gradually, like growth becoming visible only after a period of hidden work.

The high band provides the “night dew” and “canopy” of the piece: crystalline, glimmering components that sit above the listener like a delicate layer of light. These bright elements are treated carefully so that they remain luminous without becoming brittle. Their shimmer is achieved through continuously changing internal motion—small detunes, subtle modulation, and controlled excitation—so that the brightness feels like reflection rather than harsh projection. At times, Unfiltered Audio Lo-Fi-AF is used to introduce a measured amount of imperfection, helping the high region feel less synthetic and more like a fragile surface that catches light.

3.2. From Seed to Evolving Body

Serum functions as the primary engine for constructing the work’s evolving timbres, especially pads, shimmer layers, and riser materials. The design philosophy begins with simple sources—fundamental waveforms and stable cores—and then treats “life” as the result of small, continuous deviations. Layers are built so that no single component is responsible for the sound’s identity; instead, identity emerges from their interaction and from slow modulation of parameters related to thickness, brightness, and motion. When the layers begin to cohere, distortion or saturation is applied to glue the components into a single body, after which selective resampling is used to create new material that can be layered back onto the original. This resampling step is not merely for sound quality; it supports the concept by producing timbres that feel as though they have acquired “growth rings,” accumulating history through transformation.

One of the timbre designs starts with basic waveforms such as sine waves and sawtooth waves as the foundation, layering multiple waveforms with their pitches slightly off-set using the unison function of serum. Furthermore, the hyper effect is used to dynamically modulate the detune amount, giving the timbre continuous variation. (The

processing of the hyper effector is basically based on the unison effect, controlling the unison detune amount via LFO to create a dynamic sound effect. Parameters are shown in Figure 1) Subsequently, distortion effect is



Figure 1: Serum’s hyper effect parameters in “Germinate”.

added to enhance the cohesion between waveforms, and after all these steps, resampling is used to generate new waveforms, which are then layered with the original waveforms during playback to achieve a richer timbre. The processing chain is shown in Figure 2.

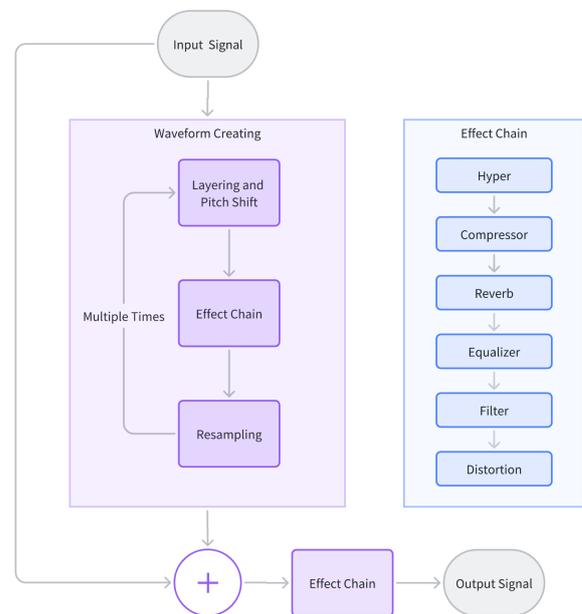


Figure 2: Sound signaling processing chain in “Germinate” with Serum.

Kontakt 7 is incorporated as an additional source of hybrid material, providing tonal or textural elements that can be integrated into the synthetic environment. Rather than presenting these sources transparently, they are treated as input for subsequent shaping and reconstruction, so that the piece retains a unified sonic ecology even when materials originate from different engines.

3.3. Making Growth Audible

A central compositional gesture in Germinate is the use of Emergence as a real-time granular processor. Here, gran-

ular technique is not approached as an occasional special effect, but as a way to make transformation itself audible. By fragmenting incoming sound into short grains and reassembling them, Emergence allows a single source to produce textures that remain related to their origin while becoming increasingly complex and alive. This supports the work’s theme directly: germination is not a sudden appearance, but a gradual reorganization of matter, and granular reconstruction provides an acoustic analogy for that reorganization.

Across the form, the granular behavior moves from greater abstraction toward greater legibility. Early in the piece, the reconstructed textures can feel cellular or subterranean, emphasizing indistinct motion and hidden pressure. As the work progresses, the granular layers can become more structured, allowing patterns, partial repetitions, or identifiable contours to surface—suggesting that what was once buried is now approaching the surface of perception. In moments of tension, the piece intensifies instability through additional processing. Fracture is used to introduce fragmentation and discontinuity, while Hysteresis extends and destabilizes time through feedback behavior, creating trails that feel like afterimages or memory. Renegade contributes articulation and gating motion, enabling pulses that read as energy surges within the organism rather than external beats.

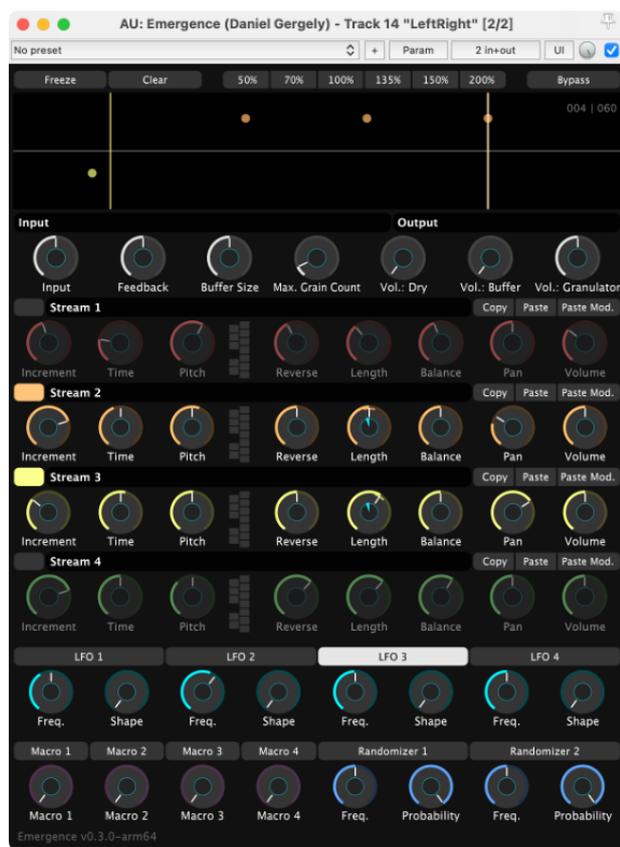


Figure 3: Granular synthesizer’s parameters in “Germinate”.

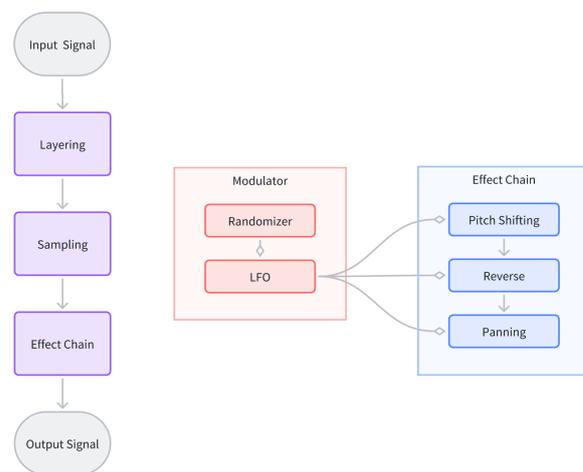


Figure 4: Sound signal processing chain in “Germinate” with Emergence.

4. Dolby Atmos Spatial Composition

Space in Germinate is treated as an active structural dimension rather than a container. The piece is realized in Dolby Atmos using Dolby Atmos Composer (fiedler audio), with additional Atmos-oriented processing via Dolby Atmos Beam Essentials. The spatial strategy follows a clear physical metaphor: the low region remains compact and centered like soil, while the mid and high layers occupy increasingly articulated regions and heights, forming an environment that feels capable of vertical growth.

Low-frequency components are kept deliberately narrow to preserve clarity and avoid the kind of phase-smearing that can make a foundation feel muddy. Midrange pads are placed in distinct regions and opened with a moderate sense of diffusion, creating breadth without dissolving the center. Importantly, vertical placement is used as a timbral and narrative cue: lower pads remain closer to the horizontal plane, while higher pads are lifted to suggest the organism’s gradual rise. High-frequency sparkle elements are placed toward the top of the field, forming a canopy of glints that reads as night air catching light.

Object-based motion is reserved for the work’s most directional gestures. Riser-like sounds are treated as Atmos objects, and their pitch trajectories are mapped to spatial travel. When pitch rises, the object moves from back to front, creating the sensation of approaching emergence; when pitch falls, the path reverses from front to back, as if receding into shadow. In this way, pitch is not only an intervallic change but also a physical route, turning the listener’s spatial perception into a metaphor for growth itself.

5. Influences

While Germinate is constructed through electronic and studio-based processes, its “night” sensibility is informed



Figure 5: Configuration of Dolby Atmos Composer in "Germinate".

by listening experiences beyond this technical domain. The piece carries an impressionistic attention to soft light, suspended time, and delicate harmonic atmosphere that I associate with Debussy's *Clair de Lune*. What resonates for me is not quotation or stylistic imitation, but the way a quiet surface can contain continuous inner motion, and how brightness can be felt as a gentle reflection rather than as overt intensity.

On another level, the work is also shaped by the sense of nocturnal intimacy and refined restraint that I associate with Bill Evans, including the mood suggested by works such as *Soirée*. Here again, the influence is perceptual: a preference for subtle dynamic inflection, fragile lyricism, and the feeling of "room air" around the sound, which in my own workflow becomes a question of spectral balance, micro-variation, and spatial placement.

6. Aesthetic Category

Table 1 shows correspondence of the aesthetic terms used in this article and the sound design.

Term	Technique mapping
Clarity	ReaEQ band-split; mono/low-spread bass; pre-granular EQ cleanup; mild saturation; keep low-band reverb short/dry.
Instability	Slow detune/width drift; Emergence random/mod; Fracture micro-cuts; Hysteresis feedback smear; Spectral Gate threshold flicker.
Texture	Emergence grain cloud; subtle noise bed; gentle distortion for tactility.
Brightness	Serum harmonics and gentle excite; tame brittle peaks with EQ; preserve transients; place HF higher in Atmos.
Shimmer / Sparkle	Micro-transients and detune drift; slow modulation to keep alive; short diffusion; top-layer placement; avoid over-smoothing/over-limit.
Flow	Long automation curves; slow LFO; gradual grain morph; Hysteresis trails as glue; crossfades and spectral handoff.
Organic	Micro-variation; resample and re-layer ; subtle Lo-Fi-AF irregularity; granular.
Cohesion	Shared mod rates; gentle sat/dist as glue; resample from layered states; consistent EQ habits; reuse the same processing "DNA".
Density	Layer count/bandwidth; Emergence density/repeat; Renegade/Spectral Gate thin-thicken.

Term	Technique mapping
Breath	Spectral Gate open/close; slow amp/brightness swell; subtle Renegade gating; gentle contouring if needed.
Canopy	HF elements placed high; moderate diffusion; keep low/mid lower to preserve vertical stratification; distinct top plane.
Crisis	Fracture fragmentation; tighter spectral crowding; faster parameter motion; Hysteresis unstable tails; higher granular randomness.

Table 1: Aesthetic Glossary Used in *Germinate*.

7. Limitations and Future Works

This piece also leaves clear room for improvement. One issue is that the timbral palette is not yet sufficiently unified: although the low/mid/high strategy provides a framework, some sounds still feel like separate materials rather than manifestations of a single organism. In addition, the intended timbral evolution is not always fully realized; there are moments where the listener may perceive changes as replacements rather than as continuous transformation.

Another weakness lies in sectional continuity. Some transitions between stages could be smoother, and the formal arc would benefit from more convincing "morphing bridges" that carry energy and identity from one scene into the next. In future works, I plan to pursue a more rigorous approach to continuous timbral development, treating each new sound as a transformation of what came before. Practically, this means designing the next timbre from the previous one—by resampling, extracting spectral fingerprints, reusing modulation behaviors, or passing material through the same reconstruction chain—so that the work maintains stronger unity while still evolving constantly.

8. Author's Profile

Jiaying QUAN

Jiaying Quan holds a Bachelor's degree in Communication Engineering from South China Normal University. Following his graduation, he worked as a Technical Audio Designer in the game industry, where he was responsible for audio programming, sound design implementation, and developing interactive audio systems. He is currently pursuing a Master's degree in Composition at Nagoya College of Music.

Mikako MIZUNO

Composer/musicologist. Basically being active in Japan, her music has been heard in a lot of locations of Europe, Asia, Australia, US and several international festivals and conferences. *Time of Laodamia, for trumpet, piano and 4ch audio* was performed as a guest piece for ICSAF in Japan and performed again in ISCM World New Music Days2024 in Faroe Islands(Denmark). Currently professor of Nagoya College of Music, president of Japanese Society of Electronic Music(JSEM), Asia/Oceania Regional Director of ICMA.



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