

POETIC SYMBIOSIS: A Bio-Algorithmic Audiovisual Installation from Slime Mold Life Cycle

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Figure 1: The dual-screen installation of Poetic Symbiosis at HKUST(GZ) CMA Diffraction Fields Exhibition 2025

Abstract

Poetic Symbiosis is a dual-screen audiovisual installation rooted in Actor-Network Theory. The work centers on the slime mold as an “actant” [3]: an ancient, non-human entity that embodies collective intelligence. Here, the slime mold’s agency generates a relational network, rendering its very existence both materially and symbolically significant[4]. Through the positive feedback loop between biological experimentation and algorithmic interpretation, the work is driven by the reaction-diffusion system from slime mold’s life cycle. The installation processes time-lapse and microscopic footage to transform biological data into visual expressions of its self-organizing algorithmic poetics. *Poetic Symbiosis* invites the audience to reconsider the nature of post-human creation and symbiosis—prompting us to ask whether, when self-organization and emergent behavior interact within the algorithm, organic entities and algorithmic systems can co-evolve in sustained symbiosis, weaving a relational network that constitutes the material-semiotic fabric of the cyborg slime mold’s techno-organic existence.

CCS Concepts

• Applied computing → Media arts.

Keywords

Bio-Art, Generative Art, Slime Mold Algorithms, Generative Agency, Video Art, Emergence

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1 Slime Mold Intelligence, Emergence, and Artistic Translation

Slime mold is a single-celled organism that lacks a central brain[1]. However, it exhibits distributed intelligence, adaptability, and collective decision-making during foraging[1]. In this process, the cells form dynamic networks that function as both living data archives and prototypes for algorithmic processes. Based on reaction-diffusion models and multi-agent behavioral principles, we established initial rules. These rules defined the system’s visual elements including form, texture, and motion vectors[2]. Once initiated, the system operates autonomously in a self-organizing state. The right screen shows time-lapse and microscopic views of slime mold growth,



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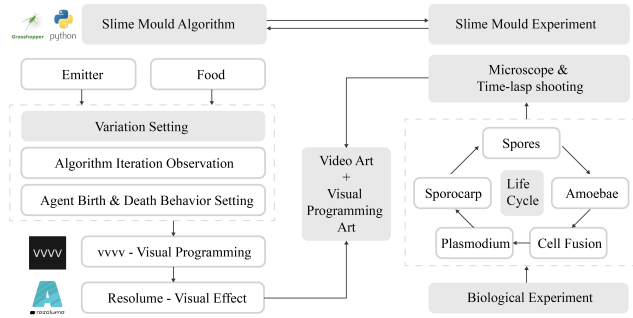


Figure 2: Workflow of Poetic Symbiosis installation

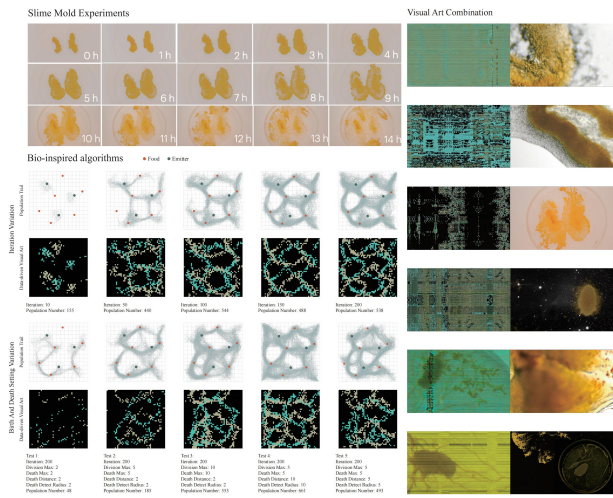


Figure 3: Slime Mold Experiment Record and Bio-Algorithm Evolution

while the left generates a poetic visual language through code that simulates its foraging behavior.

2 Life Cycle Tracking and Algorithm Evolution

Slime Mold Experiments: Using high-powered microscopy and Time-laps recording, we documented cytoplasmic flow patterns during 14 hours of foraging. External stimuli trigger the release of signaling molecules such as cyclic adenosine monophosphate (cAMP) in slime mold, thereby inducing cytoplasmic flow[1]. We also found that the slime mold network could disassemble and re-assemble within hours in response to external conditions such as changes in lighting and food availability. This ability to respond requires us to consistently “listen” and adapt to its reactions, forming a responsive relationship based on an ethics of care. All experiments adhered to ethical and biosafety guidelines for biological specimen research.

Bio-Inspired Emergent Algorithm Iteration: In the slime mold behavior modeling algorithm, fixed food source conditions were established and agent-based birth/death behaviors were modulated to track slime agent dynamics across iterative cycles. The resulting behavioral data were encoded as particle motion vectors, forming

a feedback loop within the process so that higher cytoplasmic flow produced thicker structures.

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