SYNAFLY

A continuing digital life.

Exploring persistent digital life through fruit fly brain simulation. An independent research proposal grounded in the MaleCNS connectome.

English research edition · SYNAFLY visual identity
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01

The thesis

What digital continuity means

SYNAFLY investigates persistence for connectome-derived fruit fly simulations: retaining a model's evolving state across interruptions and machine changes.

The engineering objective is a continuing computational trajectory with a traceable lineage. This does not establish biological immortality, consciousness, or the persistence of a subjective identity.

The project publishes this proposal as a research direction. A full persistence engine and experimental results are not yet available.

02

Scientific foundations

From anatomical map to computational model

The MaleCNS connectome is the original scientific resource. The Cell paper reports 166,691 neurons across the brain and nerve cord. Janelia records the v1.0 dataset release on 8 June 2026 and publication on 3 September 2026.

Google Research's account identifies HHMI Janelia as project lead. The official dataset page credits Janelia FlyEM, Cambridge / MRC LMB and Google Research. The dataset is released under CC BY.

Connectivity is a structural constraint; model dynamics require further assumptions. Shiu et al. (2024) studied sensorimotor processing with a computational fly brain model. Lappalainen et al. (2024) combined connectome constraints and task optimization in visual-system models. These are methodological precedents, not evidence of digital immortality.

A filtered simulation graph and an anatomical dataset can have different neuron and connection counts. Their numbers must not be presented as interchangeable.

03

The state we must preserve

Define what a checkpoint contains

A complete checkpoint should identify its graph, model version, parameter set, numeric format and runtime. It should include membrane potentials, refractory counters, learned gains, relevant learning traces, random generator state, the simulation clock and controlled environment state.

State must first pass continuously between simulation windows. Periodic saving cannot restore information that the simulation itself discards at a window boundary.

A useful checkpoint must preserve the full model state at a well-defined step boundary. Recovery should be tested against an uninterrupted run using the same inputs and runtime.

04

Recovery & migration

Make continuation inspectable

Write checkpoints atomically with integrity checks and maintain independent backup copies. Record the input history needed for replay, and distinguish committed state from work that may be lost in a crash.

A compatible worker should restore the same checkpoint schema before continuing. One active writer prevents contradictory histories. A deliberate fork receives a new lineage identifier linked to its parent checkpoint.

Hash checks establish file integrity, not consciousness or biological equivalence. Restoring the latest checkpoint may omit uncommitted experience; the record must disclose that gap.

05

The first experiment

A falsifiable continuation test

Run a fixed input sequence in a controlled environment. Preserve a checkpoint, interrupt one worker, restore it and compare its continuation against an uninterrupted reference run.

Measure restored-state agreement, retention of learned changes, the subsequent state trajectory and recovery on a second compatible host. Publish the inputs, runtime, checkpoint schema and comparison procedure.

Cross-platform tests require declared numeric tolerances. A changing live website is not an adequate deterministic test environment. All four tests remain planned; no pass rate or runtime record is claimed here.

06

Status & open questions

What remains to be built

Available today: this research proposal, the linked original science, public data resources and the interactive neural model. Next: a reproducible local checkpoint-and-recovery prototype.

Open questions include state completeness, numerical stability, graph compatibility, recovery gaps, storage cost and how to define a computational lineage when a state is copied.

SYNAFLY is independent of the cited research institutions. Scientific attribution does not imply affiliation or endorsement.

References & open resources

Original research and open scientific datasets.

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