

Mycelium Temporal Memory Analysis Report

EXPERIMENT OVERVIEW

Date & Time: 2026-02-20 17:45:16

Report Generated: mycelium_memory_analysis_report_20260220_174516.pdf

TEST CONFIGURATION

Test Type: Sine Wave Test

Sample Delay: 300 ms (0.3 seconds per sample)

Test Duration Setting: 60 seconds

Actual Test Duration: 60.0 seconds

Input Amplitude: 4.0 V (voltage range applied to mycelium)

Max Correlation Lag: 10 samples (3.0 seconds lookback)

Total Data Points: 200 samples

DATA COLLECTION SUMMARY

Input Voltage Range: 1.20V to 4.00V

State Voltage Range: 0.275V to 0.292V

State Voltage Mean: 0.282V ± 0.003V

Data Quality: ✓ Good

HARDWARE CONFIGURATION

Device Mode: Real Hardware

Input Device: Digilent Device 1

Measurement Device: Digilent Device 2

Temporal Memory Analysis Results

TEMPORAL MEMORY ANALYSIS RESULTS

AUTOCORRELATION ANALYSIS

Maximum Correlation: 0.4044
Optimal Lag: 1 samples (0.3 seconds)
Memory Persistence: Moderate
Interpretation: States show moderate self-similarity

CROSS-CORRELATION ANALYSIS

Maximum Input-State Correlation: 0.4226
Optimal Lag: 1 samples (0.3 seconds)
Input Memory Effect: Strong
Interpretation: Past inputs strongly influence current states

STATE PREDICTION ANALYSIS

Current Input Only R²: 0.1786
With Input History R²: 0.2245
Temporal Improvement: 0.0459
Temporal Benefit: Moderate
Interpretation: Input history moderately improves prediction

RESPONSE DECAY ANALYSIS

Status: Response decay analysis requires Step Response Test

OVERALL MEMORY ASSESSMENT

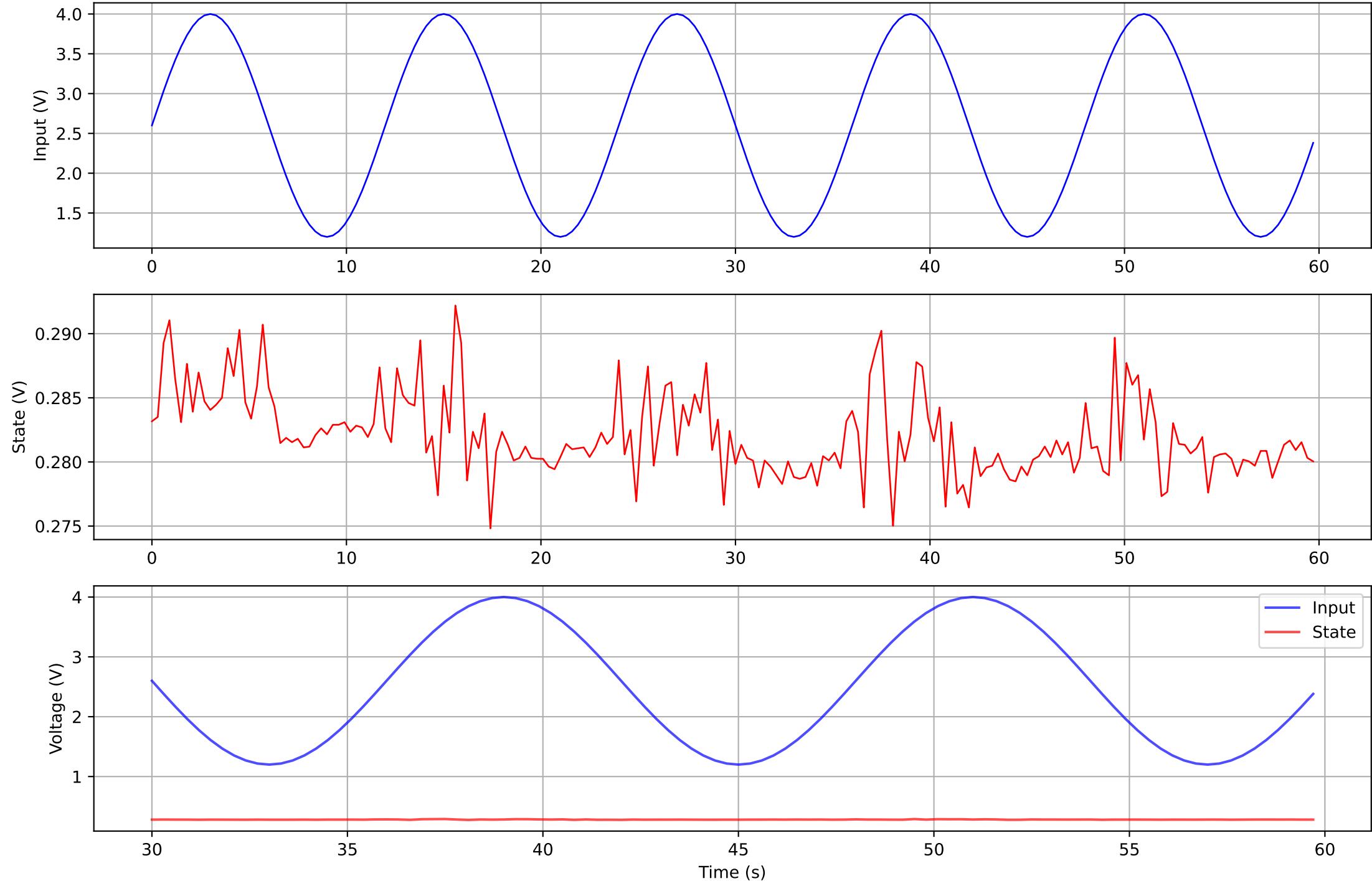
Memory Score: 3/3
★★★

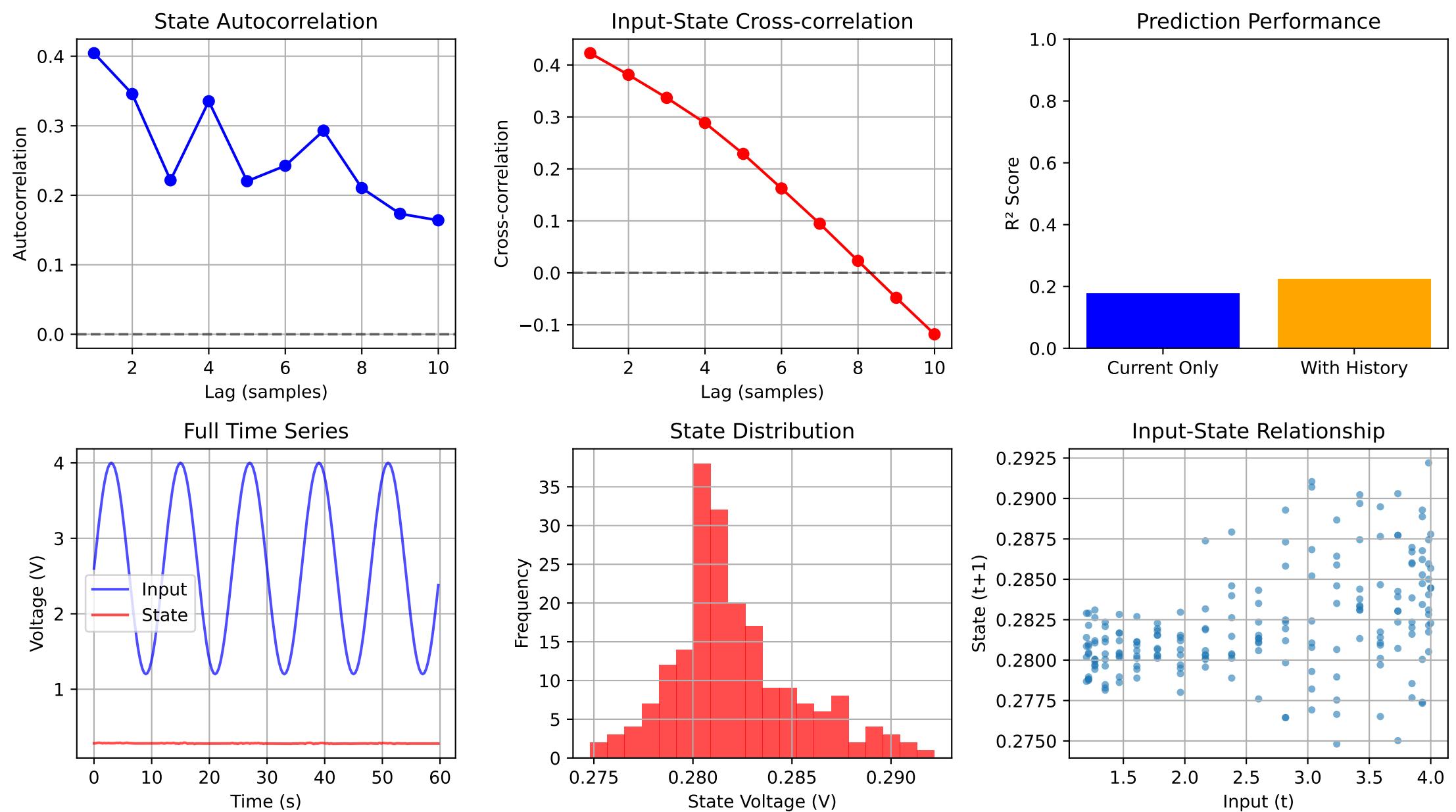
CONCLUSION: Strong evidence of temporal memory effects

RESERVOIR COMPUTING ASSESSMENT:

✓ This mycelium sample shows excellent reservoir computing potential

Sine Wave Test - Sample 200





Data Summary Tables

Parameter	Input (V)	State (V)
Mean	2.600	0.282
Std Dev	0.990	0.003
Min	1.200	0.275
Max	4.000	0.292
Range	2.800	0.017

Lag (samples)	Lag (seconds)	Autocorr	Cross-corr
1	0.3	0.404	0.423
2	0.6	0.346	0.381
3	0.9	0.222	0.337
4	1.2	0.335	0.288
5	1.5	0.220	0.229
6	1.8	0.242	0.162
7	2.1	0.293	0.095
8	2.4	0.210	0.023
9	2.7	0.173	-0.048
10	3.0	0.164	-0.118