

GRANT RENEWAL REVIEW

Adaptive Bio-Composite Materials for Sustainable Infrastructure

Year 3 Progress & Year 4–6 Renewal Request

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Engineering
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Submitted to Meridian Research Foundation
Resilient Infrastructure Grants Program
Grant No. MRF-2023-0417

Program Snapshot

Award Details

Funder: Meridian Research Foundation

Program: Resilient Infrastructure Grants

Grant ID: MRF-2023-0417

Period (current): Sept 2023 – Aug 2026

Total awarded: \$1,240,000

Renewal requested: \$980,000 (Yr 4–6)

Project Summary

Vertex Materials Lab develops mycelium-reinforced bio-composite panels as a low-carbon substitute for conventional cladding and structural infill. The current award funds material development and curing research; this renewal funds scale-up, field deployment, and certification.

Project Team

Dr. Elena Castellano — PI; Dr. Samuel Okafor — Co-PI

Dr. Ingrid Lindqvist — Postdoctoral Researcher

Chen, Nair, Kowalski — PhD Students

1 Laboratory Technician (0.5 FTE)

Today's Agenda

Aims vs. progress (Year 1–3)

Publication and dissemination output

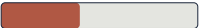
Budget execution and burn rate

Risks and mitigations

Year 4–6 renewal justification and ask

Aims vs. Progress

Cumulative status at end of Year 3

Aim	Progress	Status
Aim 1: Mycelium-reinforced panels, compressive strength ≥ 28 MPa	 92%	Complete
Aim 2: Freeze-thaw durability across 500 cycles	 78%	On Track
Aim 3: Low-energy curing process, target $<60^{\circ}\text{C}$	 65%	On Track
Aim 4: Field pilots with two municipal partners	 40%	Behind

Highlights

Aim 1 exceeded target strength (31.4 MPa mean, $n = 340$ specimens), 8 months ahead of schedule.
Aim 4 delayed by procurement cycles at the second partner; see mitigation, Slide 7.

Aim 4 in Detail: Field Pilot Partnerships

Apex Municipal Works — Confirmed

Site: Riverside Transit Shelter Retrofit
Panel order: 240 units, cladding application
Installation window: Q1 Year 4
MOU signed March 2026



Second partner in active negotiation

Nimbus County Public Works — In Negotiation

Site: Regional library structural infill panels
Blocked on county procurement review board
Target decision: October 2026

Publication & Dissemination Output

Year 1–3 cumulative

Type	Title	Venue	Status
Journal	Compressive and Flexural Behavior of Mycelium-Reinforced Bio-Composites	Journal of Sustainable Materials Engineering	Published, 2024
Journal	Freeze–Thaw Durability of Bio-Composite Panels: A 500-Cycle Study	Construction Materials Review	Under review
Conference	Low-Energy Curing Pathways for Regional Bio-Composite Manufacturing	Intl. Symposium on Green Building Materials	Published, 2025
Preprint	Field Performance of Bio-Composite Cladding in Temperate Climates	MaterialsArXiv	Posted, 2026
Dataset	Bio-Composite Mechanical Testing Dataset ($n = 340$ specimens)	Aldercreek Research Data Repository	Released, 2025
Patent	Low-Temperature Curing Method for Fungal Bio-Composite Panels	U.S. Patent Office	Filed, 2025



Written Output

6

outputs across 3 types



Presentations

3

conference talks, 1 workshop



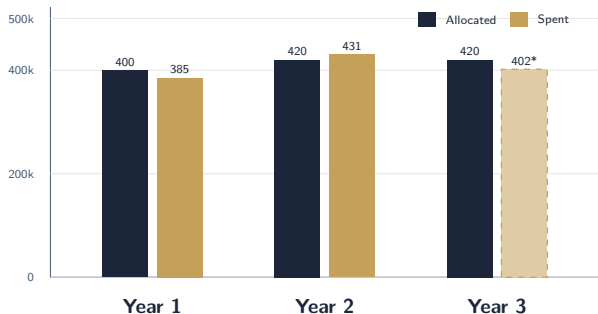
Media

2

regional press features

Budget Burn: Allocated vs. Spent

Figures in USD, thousands



*Year 3 spend projected from actuals through Q3.

3-Year Summary

Total allocated: \$1,240k
Total spent: \$1,218k
Variance: -1.8%

Reading the Chart

Year 2 ran 2.6% over on equipment procurement (see next slide).
Overrun absorbed via indirect-cost savings; no supplemental request made.

Budget by Category

Cumulative Year 1–3, figures in USD

Category	Allocated	Spent	% Used
Personnel & stipends	\$640,000	\$652,400	102%
Equipment & materials	\$310,000	\$318,900	103%
Field trials & partnerships	\$150,000	\$121,600	81%
Travel & dissemination	\$70,000	\$61,200	87%
Indirect costs	\$70,000	\$63,900	91%
Total	\$1,240,000	\$1,218,000	98%

Note

Personnel and equipment overruns in Year 2 were offset by underspend in field trials, pending confirmation of the second municipal partner (Aim 4). Net program variance remains within 2% of total award.

Risks & Mitigations

Risk	Level	Mitigation
Second municipal partner delay (Aim 4)	Medium	Parallel negotiation opened with Nimbus County; backup discussions with Synapse Urban Development.
Mycelium substrate supply variability	Low	Dual-sourcing agreement signed with two regional suppliers.
Postdoc contract ends mid Year 3	Medium	Renewal budget includes a funded 12-month extension line item.
Year 2 equipment cost overrun	Resolved	Absorbed via indirect savings; contingency line added for Year 4–6.

Watch Item for Renewal Period

The Aim 4 timeline is the single dependency most likely to affect the Year 4–6 schedule. If the Nimbus County decision slips past October 2026, the field-pilot milestone shifts to Q2 Year 5 without affecting total budget.

Year 4–6 Objectives

1. **Complete field pilot installations** at both confirmed municipal sites and instrument panels for two full seasonal cycles.
2. **Scale the curing process** from bench pilot to a production line rated at 500 panels/month.
3. **Publish the full durability dataset** and open a building-code certification pathway with regional standards bodies.
4. **Establish a commercialization pathway:** exploratory spin-out discussions under the working name Vertex BioBuild.

Why Renew Now

Years 1–3 de-risked the core material science: strength targets were exceeded and the curing process is validated at pilot scale. The renewal period converts that lab result into field-proven, code-eligible infrastructure product — the step that determines whether this technology reaches deployment at all.

Renewal Budget Request

Year 4–6, figures in USD

Category	Requested	Share
Personnel & stipends	\$480,000	49%
Equipment scale-up (pilot line)	\$220,000	22%
Field pilots & partnerships	\$150,000	15%
Dissemination & certification	\$80,000	8%
Indirect costs	\$50,000	5%
Total request	\$980,000	100%

\$980,000 over 3 years (Year 4–6), continuing Meridian Research Foundation's Resilient Infrastructure Grants Program, to move Adaptive Bio-Composite Materials from validated pilot to field-proven, certifiable infrastructure product.

Thank You

Questions and discussion welcome

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