



Objective

The Product Development and Implementation Division at Cotton Incorporated invites research proposals that address strategic opportunities in cotton utilization and market development. Cotton Incorporated is committed to applied research with clear, near-term pathways to real-world implementation. Funded projects should demonstrate strong potential for translating laboratory findings into production-ready solutions, with a focus on strengthening cotton's competitive position in both established and emerging markets.

Cotton Incorporated invites proposals addressing one or more of the following priority research areas:

1. Biodegradation of Dyed Cotton Textiles

Current biodegradation research on textiles rarely accounts for the combined influence of dyes and finishing chemistries, nor does it reflect the complexity of real-world environmental conditions. Existing data gaps limit the industry's ability to make accurate environmental claims and develop truly biodegradable products.

- a. Conduct a whole-system biodegradation study that examines the combined effects of fiber, dye, and finishing chemistries on degradation behavior, environmental persistence, and by-product formation, rather than assessing each component in isolation.
- b. Design simulation studies that replicate both water column and sediment conditions in marine environments to produce realistic biodegradation assessments, accounting for variability in oxygen levels, microbial communities, and light exposure across environmental zones.

2. New Market Development for Cotton and Its Byproducts

Cotton and its processing byproducts remain largely underrepresented in high-value bio-based material markets, including packaging, hygiene, composites, and functional textiles. Expanding cotton's market footprint requires both product development and rigorous commercial and environmental validation.

- a. Investigate the conversion of cotton ginning and spinning byproducts into value-added bio-based products such as rigid or flexible foam, insulation, or absorbent hygiene materials,

and conduct techno-economic analysis to assess commercial viability and environmental sustainability of the new product.

- b. Develop cotton cellulose nanocrystal (CNC)-based coatings, films, or composite materials as biodegradable alternatives to petroleum-based packaging and structural materials.
- c. Develop durable, functionalized cotton as a bio-based stretch material suitable for use across hygiene and apparel product categories.
- d. Assess the commercial scalability and life cycle impacts of cotton-derived biocomposite entering packaging, automotive, and building material markets.

3. Biodegradable Alternatives to Single-Use Plastics

Regulatory pressure and consumer demand are driving an urgent need for biodegradable replacements for single-use plastics in packaging and disposables — a market where cotton's natural biodegradability offers a competitive advantage that remains largely untapped.

- a. Research the development of cotton-derived films, wraps, or barrier coatings as biodegradable alternatives to polyethylene in flexible packaging applications.
- b. Develop cotton-based single-use hygiene or personal care products (wipes, pads, swabs) engineered for full biodegradation, to displace synthetic nonwoven equivalents.
- c. Evaluate the techno-economic feasibility of cotton linter pulp as a substitute for wood pulp in specialty papers and bio-based packaging materials.

4. Replacement of Petrochemical- and Fluorinated-Based Textile Finishes

Most functional textile finishes — including softeners, wrinkle-resistance treatments, and water repellent treatments — rely on petrochemical or fluorinated chemistries that carry known health and environmental risks. The industry lacks commercially viable bio-based alternatives that match performance benchmarks.

- a. Identify and validate bio-based finishing agents (such as chitosan, starch, and plant extracts) for cotton that deliver competitive performance without harmful residues.
- b. Develop a durable, biodegradable finish derived from cotton byproducts that is effective at lower processing temperatures than conventional chemical finishes.

5. Valorization of Cotton Processing Byproducts

Cotton byproducts generated throughout the fiber-to-garment supply chain — at ginning, spinning, and other processing stages — are largely discarded or underutilized, representing a significant missed opportunity for value creation and waste reduction.

- a. Investigate conversion pathways for spinning and ginning byproducts into high-value bio-based materials for use in insulation, packaging, or composite applications.
- b. Develop processing routes to upcycle cotton byproducts into nonwovens, biocomposite reinforcements, or technical textiles, and evaluate the performance and scalability of resulting materials.

6. Predictive AI Modeling for Cotton Manufacturing

The cotton manufacturing process involves complex interactions between fiber properties and machinery parameters, whose combined effects on yarn and fabric performance are difficult to anticipate. Lack of predictive tools leads to inefficiencies in product development and quality control.

- a. Develop predictive AI models that integrate cotton fiber properties and machine characterization data to forecast yarn characteristics and downstream fabric performance, enabling data-driven optimization of the manufacturing process.

Priority consideration will be given to targeted research initiatives with well-defined scope parameters, specifically those structured to deliver demonstrable preliminary outcomes within a **6–12-month timeframe**. All research activities must be completed by December 2027, with comprehensive final deliverables submitted in accordance with established reporting protocols. Projects showing exceptional promise may qualify for extended funding for the following year.

Background

Cotton Incorporated’s mission focuses on driving sustainable growth in cotton demand while enhancing producer profitability throughout the industry ecosystem. Our funding decisions favor proposals with well-articulated commercial applications and measurable market impact potential. Prospective applicants should consult our company website (www.cottoninc.com) to gain comprehensive insight into Cotton Incorporated.

Pre-Proposals

Researchers are encouraged to submit a concise pre-proposal prior to developing full documentation. This initial submission, which includes a brief email outlining the concept, methodology, and **budget requirements**, facilitates collaborative refinement of objectives aligned

with organizational priorities. Pre-proposals must specify the target research category and be limited to fewer than three per investigator.

Upon approval, candidates will receive an invitation to submit comprehensive proposals with sufficient preparation time allotted. All pre-proposals must be submitted electronically by **Sunday, May 31st, 2026**. Late submissions will not qualify for consideration in the 2027 funding cycle.

Pre-Proposal Submission

Submit all pre-proposals electronically no later than **Sunday, May 31st, 2026**. Only pre-proposals that meet our strategic criteria will advance to the full proposal stage. Direct all pre-proposal submissions to:

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