



# Fiber Science

**Build on the foundations in the natural, life, and physical sciences, engineering, and mathematics to develop and control fibrous materials to better human lives.**

Fibers are a one dimensional material, making it especially unique. The fiber industry needs people who understand this property and the distinct process to develop and make fibers. Properties of length, strength, and failure rates must be understood in a way that differ from other materials as these properties are mission critical.

## Program Highlights

- Biomedical materials
- Ergonomics and comfort
- Fiber based sensors and detectors
- Green composites
- Nanotechnology
- Performance enhancing fabrics
- Sustainable materials and processes

**F**ibers are some of the oldest materials used by humans and are everywhere - from clothing to seat belts, from green composites to life-saving medical implants, and from airplanes to flavor fillers in ice cream.

Fiber Science studies the relationship between the science and assembly of materials, and how they perform in systems ranging from clothing to medical and built environments. Students learn how the principles of fiber science influence the design and fabrication of traditional and innovative products by studying the physical, chemical, biomedical, and engineering properties of fibrous materials, advanced engineering composites, geotextiles, nanofibers, and textiles.

Students pursue a unique, interdisciplinary curriculum that includes the social sciences

and humanities, which enables them to consider the human component and societal impact of the engineering and technological advances being developed. The depth in the natural sciences and engineering can be meaningfully complemented by an aesthetic perspective for those who are also interested in creative pursuits in the fashion and textile industry and beyond. Collaborative work with other departments further informs how industries will utilize fibers.

Graduates of the Fiber Science major seek employment in a variety of fields and are academically prepared for graduate and professional programs.

## Curriculum

This versatile major allows students to explore their individual interests without feel-

## Requirements in the Major

- Fiber and Yarn Analysis Laboratory
- Fiber Science
- Fibers, Fabrics, and Finishes
- Fiber Chemistry
- Introduction to Computer Programming or Introduction to Computer-Aided Design
- Structural Fabric Design
- Textiles, Apparel, and Innovation
- Product Quality Assessment

### Any one of the following:

- Biomedical Materials and Devices for Human Body Repair
- Chemistry of Textile Finishes and Dyeing
- Rheology of Solids
- Fiber Formation: Theory and Practice
- Mechanics of Fibrous Assemblies
- Physical Properties of Fiber Forming Polymers and Fibers

### Additional courses

- Calculus
- Chemistry
- Organic Chemistry
- Physics
- Communications or Foreign Language
- Ethics
- Introduction to Statistics
- Economics
- Humanities and Social Sciences

### Choose a concentration in

- Biology
- Materials Science
- Ergonomics
- Chemistry

## Faculty Research Interests

- Athletic products and performance
- Development of fully degradable, fully sustainable, environment-friendly 'green' composites
- Electrospun controlled absorption, timed-release fabrics (controlled absorption and release of chemicals)
- Interfacing fiber science and nanotechnology
- Rapidly renewable polymers as engineering materials
- Smart clothing
- Synthesis of biodegradable polymers and hydrogels having biologic functions for wound closure, drug control/release, and tissue engineering use
- Textile nanotechnology and smart fibers: functional nanolayers
- Thermal comfort and mobility of clothing
- Use of personal protective equipment to reduce human exposure to pesticides

ing constrained by a specific track. A student can focus on the development of new high-performance fibers for high-way construction, reinforced composite materials for aircraft or sports gear, electronic circuit boards, artificial membranes, arterial grafts for medicine, or smart and protective clothing for industry and the military.

Fiber Science majors complete the college's liberal arts-based requirements in the natural and social sciences, humanities, writing, statistics and calculus to provide context to their major course work. Students further customize their curriculum through broad engineering or science categories or as electives.

Courses ranging from *Fiber and Yarn Analysis* and *Fiber Chemistry* to *Computer Aided Design* and *Biomedical Materials and Devices for Human Body Repair* provide students with tools that focus on the impact of Fiber Science on contemporary human issues.

## Special Opportunities

Research, studying abroad, and field experiences add a significant experiential component to the course of study, providing valuable practical knowledge while testing students' academic and career interests.

Undergraduate research can be pursued with a faculty mentor and through special projects with student teams. Students can also apply to the Honors program to pursue an independent research inquiry under the guidance of a faculty member.

Many students choose to study abroad or participate in the college's Urban Semester program in New York City, or in an international exchange program, such as through the Hong Kong Polytechnic University, among others.

Students engage in summer internships in technical apparel, personal care, and semiconductors, as well as military and testing labs. Additional field experiences include summer research positions, medical internships, or National Science Foundation funded Research Experience programs.

## Careers

Fiber Science students have found jobs in diverse industries such as aerospace, consumer products, fashion, textiles, automotive, oil/gas, sports, and communications. Recent graduates have begun careers in the fiber, textile, and chemical industries, as well as with government agencies developing and evaluating new products, conducting research, providing technical services, helping to ensure product safety, and coordinating consumer information programs.

Many students pursue programs at the nation's top professional programs in medicine, business, and law, as well as graduate degrees in science and engineering majors.

## Selected Graduates

**Pediatrician**, Boston Medical Center

**Physical scientist**, The North Face

**Technical Sales, DSM Patent Attorney**, US Patent and Trademark Office

**Ph.D. Materials Science**, Drexel University and Haute Tech Lab

**Director of Product Design & Development**, Kent Wool

**Laboratory Technician/Protective Clothing**, Intertek Laboratories

**Textile Technology Patent Examiner**, USPTO

**Director of Materials Management**, Wolverine International

**Manager Quality Assurance**, Bed Bath & Beyond

**Semi-conductor Process Engineer**, IBM

**MBA, Director CRM & Analytics**, Kiehls

**Ph.D. History, Anthropology, Science, Technology and Society**, Post-doc Singapore University of Technology & Design

**MS, Medical Devices & Diagnostics, Project Manager**, Tandem Diabetes Care

**MS Materials Science, Energy Efficiency Engineer**, Air Force

**Senior Innovation Designer**, Nike

**Textile Product Analyst**, Good Housekeeping

## For More Information

[www.human.cornell.edu/fsad](http://www.human.cornell.edu/fsad)

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