MATERIALS RESEARCH AT UNB
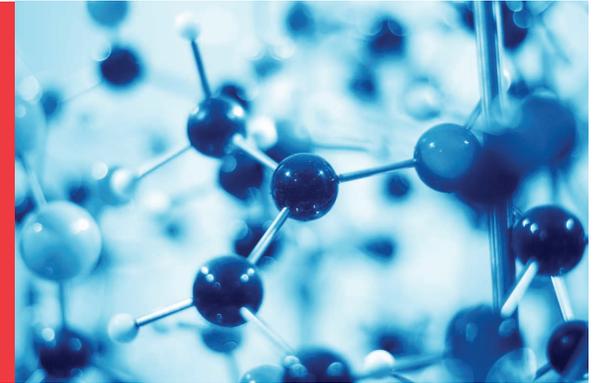
The Stone Age, the Bronze Age, the Iron Age - materials have marked the chapters of the history of human civilization.

The "high-tech" of the day has been directly dependent on the understanding and exploitation of materials available at the time. Materials research conducted at the University of New Brunswick (UNB) is having a significant impact on applications in important sectors such as medicine, energy, architecture/construction, manufacturing, and consumer products. The

University not only possesses and utilizes leading edge material characterization equipment, it is also inventing new methods, such as magnetic resonance imaging techniques that are now used by leading laboratories worldwide.
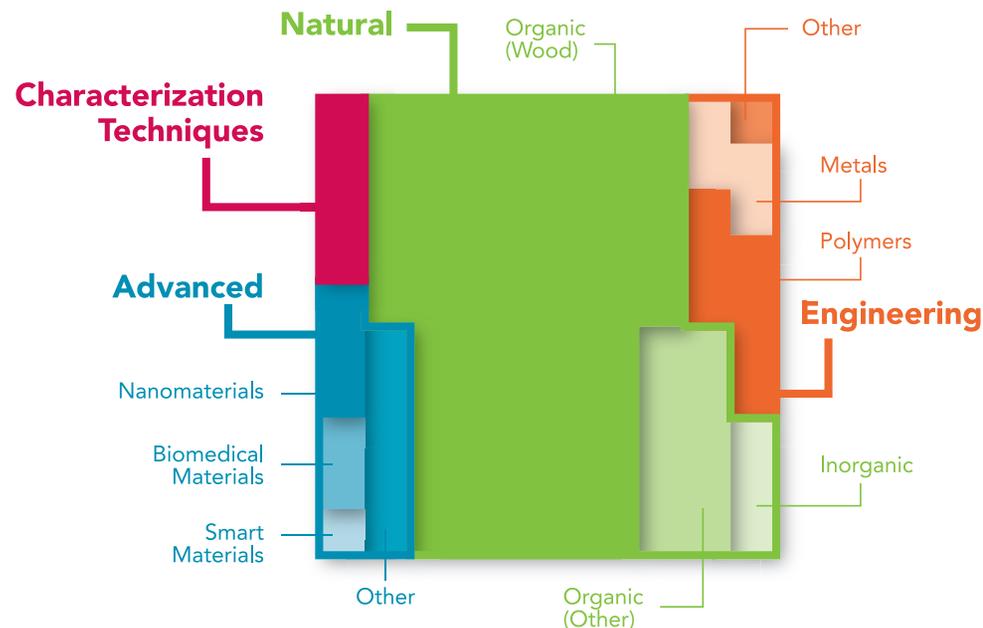
A significant amount of research effort is directed at biomaterials, particularly wood and its derivatives. This has led to technological advancements in wood products used in architecture and construction; paper and paper packaging; consumer products; cellulose, natural polymers and other new materials derived from the integrated forest biorefinery concept; sustainably developed biofuels; and non-contact sensing systems for materials utilized in various forest product manufacturing processes. Other natural materials research streams include biologically active natural products for medical use, as well as investigations into naturally occurring inorganic materials such as minerals, metals, and petroleum resources.

Research Focus Areas

Natural
Organic (Wood)
Other
Characterization Techniques
Metals
Polymers
Advanced
Engineering
Nanomaterials
Biomedical Materials
Inorganic
Smart Materials
Other
Organic (Other)

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UNB's research in advanced materials includes nanomaterials (e.g., fullerene for solar panels, thin film optical filters, and conductive polymer nanocomposites), biomedical materials (e.g., biocompatible materials for bone and tissue applications, and nanoparticles used in pharmacological and molecular therapy), and smart materials (e.g. organic semiconductors and stimuli responsive foldamers). Other advanced materials research includes studying the complex adsorption/diffusion and catalytic phenomena of nanoporous materials, as well as the investigation of redox-active compounds for organic batteries.

Engineering materials research includes polymers (e.g., for packaging, drug delivery, and enhanced oil recovery), metals (e.g., material properties in relation to manufacturing processes such as casting, rolling and machining), and concrete (e.g., understanding alkali-silica reaction, and delayed ettringite formation).

50
Average number of faculty undertaking research in this area each year

$7.4 million
Average amount of funding received for research in this area each year

135
Average number of research projects in this area each year

10 Faculties and Departments pursuing research in this area

- **Engineering**
  - Chemical Engineering
  - Civil Engineering
  - Electrical and Computer Engineering
  - Mechanical Engineering
- **Forestry and Environmental Management**
- **Science**
  - Chemistry
  - Earth Sciences
  - Physics
- **Science, Applied Science and Engineering**
  - Biological Sciences
  - Mathematics and Statistics

11 Facilities and Groups conducting research in this area

- **Institutes and Centres**
  - Dr. Jack McKenzie Limerick Pulp and Paper Research Centre
  - Magnetic Resonance Imaging (MRI) Research Centre
  - Wood Science and Technology Centre (WSTC)
- **Labs and Research Groups**
  - Applied Nanotechnology Lab (ANL)
  - Bioenergy and Bioproducts Research Lab (BBRL)
  - Centre for Laser, Atomic, and Molecular Sciences (CLAMS)
  - Concrete Materials Group
  - Microscopy and Microanalysis Facility (MMF)
  - Natural Products Research Group (NPRG)
  - Silicon Hall Laboratory
  - Wood Sensing Laboratory

4 Research Chairs engaging in research in this area

- **Canada Research Chairs**
  - Materials Science MRI
  - Pulp and Paper Science and Engineering
- **Other Research Chairs**
  - NBIF Advanced Wood Products
  - Richard J. Currie Chair in Nanotechnology

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