

B<sup>3</sup>E @ McGill: opportunities for interdisciplinary education, training, and research

## **B<sup>3</sup>E: Bioengineering, Biomedical Engineering, and Bioresource Engineering at McGill University**

The Departments of **Bioengineering**, **Biomedical Engineering**, and **Bioresource Engineering (B<sup>3</sup>E)** constitute the rapidly expanding interdisciplinary ecosystem at the interface of *engineering* and *biological sciences, medicine, environment, food, agriculture, pharmaceuticals, and/or biomanufacturing*. Graduates of McGill B<sup>3</sup>E programs solve engineering problems and conduct engineering design in biological and medical systems and extend the frontiers of applied science research across scales, from biomolecules to ecosystems, encompassing cells, tissues, and organisms. The McGill B<sup>3</sup>E disciplines are at home in the three Faculties of Engineering, Medicine and Health Sciences, and Agricultural and Environmental Sciences, each providing specialized and complementary, undergraduate and graduate education and research.

The [Department of Bioengineering](#) in the Faculty of Engineering accepts undergraduate students into a highly competitive **B.Eng. in Bioengineering**, which educates engineers with a strong foundation in biological sciences, specializing in: (i) **biological materials, mechanics, and sensing**, (ii) **biomolecular, cellular, and tissue engineering**, or (iii) **biological information and computational bioengineering**. Bioengineering graduates work in the medical and pharmaceutical industries as well as many other areas where an engineering perspective on the life sciences is needed, or progress to graduate programs, which may be either engineering-orientated, or in medical schools. The Department also co-administers the Biological & Biomedical Engineering (BBME) program described below.

The [Department of Biomedical Engineering](#) in the Faculty of Medicine and Health Sciences offers a **Certificate in Translational Biomedical Engineering** for students and professionals from diverse backgrounds and supports the **Minor in Biomedical Engineering**, which is open to all B.Eng. undergraduate students at McGill. The department also co-administers the BBME program described below.

The [Department of Bioresource Engineering](#) in the Faculty of Agricultural and Environmental Sciences, operating at the Macdonald Campus, offers **B.Eng. in Bioresource Engineering** (including **Freshmen Program** for out-of-province students, an **professional agrology** option, and honors program) focused on: (i) **bio-environmental engineering**, (ii) **bio-production engineering**, or (iii) **bio-process engineering** as well as **M.Sc.**, **M.Sc.A.**, and **Ph.D.** programs. Students are trained in the application of engineering principles to plants, animals and biomaterials, and ecosystems. Bioresource engineers seek sustainable solutions for the production and processing of food and biomaterials, and the preservation and regeneration of the quality of soil, water, and other natural resources, with applications in agriculture, forestry, food industry, environmental protection, ecological management, bioenergy, and other related industries. In addition to thesis graduate programs, focused non-thesis programs are available in the areas of **integrated water resources management, environmental engineering, and integrated food and bioprocessing**.

The inter-faculty [Biological and Biomedical Engineering \(BBME\)](#) graduate program offers **M.Eng.** and **Ph.D.** studies, and opportunities for collaboration, training, and research in a clinical environment. The program covers extensive areas of research and training, notably: (i) biomedical sensors, diagnostics and therapeutics, (ii) bio-signals and -systems, (iii) biomolecular and cellular engineering, (iv) biomedical modelling, (v) bioinformatics and computational biology, (vi) biomaterials and tissue engineering, (vii) bio-imaging and microscopy. The BBME program, co-administered by the Departments of Biomedical Engineering and Bioengineering, is open to graduates of engineering and natural sciences undergraduate programs.

All **B<sup>3</sup>E** programs provide their students with an opportunity to receive instruction and participate in other academic activities shared among the three Departments as well as with other academic units in the faculties of Engineering, Medicine, Agricultural and Environmental Sciences and other faculties, such as Sciences or Management. Our academic faculty and staff are dedicated to guiding incoming students through the entire McGill experience and they share their excitement and passion for Bioengineering, Biomedical Engineering, and Bioresource Engineering. Together our B<sup>3</sup>E disciplines will help resolve contemporary and emerging problems around the world.

Welcome to McGill's **B<sup>3</sup>E** programs!

