

From K to university

Tomorrow's engineers find a nurturing pathway ahead

Grades 7 and 8 students are challenged to design a protective structure capable of keeping an egg from harm as it undergoes the impact of a toy car crash test. High school students compete to design and build the best wind turbine or "robotic arm." Hands-on activities like these might appear like fun and games, but they are all part of National Engineering Month – an annual event that takes place in March designed to show young Canadians that engineering is an exciting career worth considering.

Meanwhile, deans at some of Canada's top engineering schools are leading the development of new programs and facilities designed to prepare those who pursue the profession for rewarding careers and a lifetime of opportunity.

Engineers Canada President Dan Motyka, FEC, P.Eng., says, "We need to show children that math and science aren't 'scary' and that engineering offers a growing number of career options."

Beyond National Engineering Month and a national outreach campaign appealing to parents and high school students, Engineers Canada also sponsors the Iron Science Teacher competition, where teams of high school science teachers demonstrate scientific or engineering concepts. After regional playoffs, the national competition is broadcast on the Discovery Channel.

Programs like this aim to address a looming shortage of professional engineers that is expected as boomers retire. "We must ensure we can meet tomorrow's needs, and that starts with engaging children at

a young age," says Mr. Motyka.

At the university level, engineering schools are advancing programs that respond to new engineering fields and other requirements expected of professional engineers.

The Faculty of Engineering and Design at Carleton University in Ottawa is building a new facility to meet a surging demand for engineering expertise in medicine, health care and sustainable energy.

The faculty now has a Canada Research Chair in Biomedical Engineering and has developed a four-year bachelor's program in biomedical and electrical engineering. The program includes design of medical instruments, technologies for medical imaging, patient monitoring systems and storage of electronic health records.

"We also have a biomedical and mechanical engineering bachelor's degree, covering such areas as artificial tissues, biomaterials, prosthetics and cardiovascular devices," says Carleton Dean Rafik Goubran, PhD, P.Eng. "In both biomedical programs, students also study physiology, anatomy, and health care standards and ethics. They gain knowledge about the engineering specialty they will apply to health care, but also about the realities and challenges in health care."

The new facility will also house a team of professors and researchers supporting a new environmental engineering offering – an undergraduate degree in sustainable and renewable energy. Another addition is a master's degree in infrastructure protection and international security. "These are growing priorities in our

society, and engineers have a key role to play," Dr. Goubran says.

To make sure its engineering graduates are "real contributors to innovation in a company," the École Polytechnique de Montréal revamped its undergraduate programs in 2005, says executive director Christophe Guy, PhD, ing.

Polytechnique is one of four Canadian universities that has joined the international CDIO (Conceive-Design-Implement-Operate) Initiative – an engineering education model that emphasizes practical learning through team-based projects and industry involvement. Industrial internships are also required.

Polytechnique has also added programs to meet industry demands, including Quebec's first aerospace engineering bachelor's program and Canada's first bachelor's program in biomedical engineering. The school has expanded research and industrial partner-



ships, and plays a lead role in many Quebec research consortia including the Interuniversity Research Centre for the Life Cycle of Products, Processes and Services.

"We have also created an accelerated PhD program, in

line with changes occurring in Europe, for example," says Mr. Guy. "It's important that we keep pace with international competition because we have a lot of foreign students." And with more engineers working globally, Polytechnique is promoting international exchanges and has

developed a number of double degree programs with international institutions.

The aforementioned undergraduate programs will soon be considered for accreditation by the Canadian Engineering Accreditation Board.

A world of opportunity, indeed. ■