How can engineering improve people's lives?

The engineering profession is exploding around the world to meet the demands of our very technology-driven human culture. From robotics to harnessing renewable energy sources to a simple, noninvasive tuberculosis test, engineers in the US are contributing to human comfort, ease of living, and turning tomorrow's dreams into reality.

Simply put, engineering combines math and science for use in practical applications. The area of application helps divide the broad field of engineering into various disciplines including, but not limited to:

- Aeronautical
- Biomedical
- Chemical
- Civil
- Computer (Software and Hardware)
- Electrical
- Environmental
- Mechanical engineering

Engineering has recently become very interdisciplinary, requiring a combination of various engineering fields.

For example, the field of mechatronics combines mechanics, electronics, and control systems, and complex projects usually bring together engineers from multiple disciplines.

Thus, today's engineering student should take advantage of schooling where multiple disciplines are taught and where the students and faculty work together across disciplines to solve real world problems.
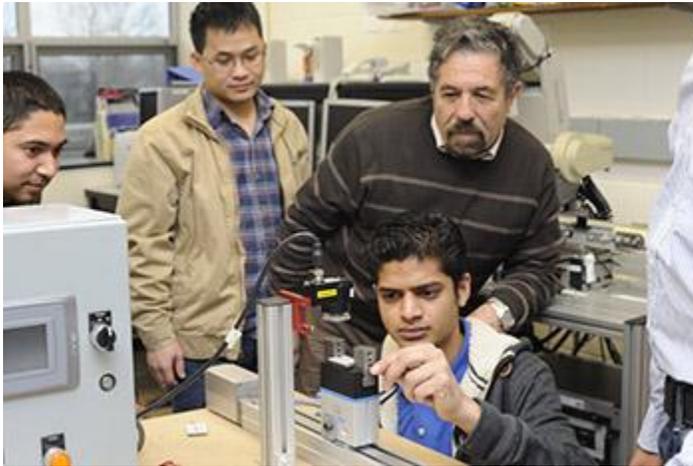
"Complex projects usually bring together engineers from multiple disciplines"

For example

An example of a cutting edge environmentally-friendly interdisciplinary research project being conducted nowadays would be the automation of the disassembly of end-of-life products. That is, products that have a useful life, but for which there is little to no demand.

Disassembly is already an established industry, but the operations are complex, time-consuming, and expensive.

Some cost recovery occurs through the resale of recovered materials. However, manpower is the major cost, so an automated solution could help reduce costs significantly.

Research teams of computer, mechanical, and industrial engineering faculty and students are working on a solution, using several research laboratories including:

- Robotics
- Intelligent Sensing
- Control Labs

- Sustainable Energy and Environment Labs
- and Programmable Logic Control Systems Labs

The green engineering team proposes a new model for disassembly that employs robots and introduces the use of an online dynamic genetic algorithm to conduct an 'intelligent' survey and assessment of module components, followed by the coordination of the disassembly process.

This process allows for a time-effective assessment of both typical and uncommon alterations that may have been made after product purchase through repair, upgrade, or to meet personal preferences.

The disassembly 'cell' consists of an industrial robotic manipulator fitted with a webcam, and a PC enhanced with additional hard drive and RAM that is programmed with component segmentation and range-sensing visual algorithms.

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An example from biomedical engineering

In the field of biomedical engineering, a non-invasive tuberculosis testing is being researched that would be a tremendous boost for testing in developing nations.

A layer-by-layer, paper-based test using 'invisible ink' comprised of a gel sensing protein is being developed to measure TB-associated protein in urine.

Engineering in the USA

Among the many disciplines, engineering students in the US should have plenty of hands-on experiences and faculty mentoring through working on an array of projects.

Whether you are a student from China who might help rural women learn modern irrigation technology and water management or a student from India who can help develop the efficient use of wind turbines as an alternative energy source, you will have many opportunities to learn and practice engineering in action at your university of choice and through regional and national research and scholarly conferences that will help launch a successful career after graduation.

By Tarek Sobh, Vice President for Graduate Studies and Research and Dean of the School of Engineering at the University of Bridgeport