Biomechatronics

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In this session we will explore the use of biomedical knowledge in the development and optimization of electromechanical devices and systems. Biomechatronics involves the interdisciplinary study of biology, mechanics, and electronics. Various definitions for this field of science and engineering may be found throughout the literature. Given the rapid progress made in this area and the large investments planned for the future, both in industry and academia, it is a field of study that will likely continue to redefine itself for years to come.

The heart pacemaker represents one of the early examples of biomechatronic devices. Advancements in the fields of biomedical and electrical engineering have resulted in advanced cardiac rhythm management devices that far exceed the performance of earlier systems. Those same systems have also provided a platform for the development of efficiently packaged, sensing and stimulation devices that address a broad array of medical needs from deep brain stimulation for Parkinson's disease to site specific delivery of drugs with implantable pumps.

Other examples of biomechatronic devices include systems that sense light or sound and communicate with the brain and the development of advanced prostheses systems. Interaction between the human body and medical aids for information exchange (neural interfacing) has created the possibility of designing intelligent prostheses and orthotic systems that may adapt to the user's requirements and conditions of use.

Developments in such device systems are also being driven by an aging population in developed nations, the need to reduce financial burden on healthcare systems, and access to such therapies in developing nations. At an ever-increasing rate, innovative biomechatronic devices that sustain life and return people to full life are being realized.