

Preface

The spiraling increase in healthcare costs and the growing number of those who have no health insurance are two daunting healthcare challenges for the United States to overcome in the coming decades. In the meantime, progress in science, engineering and medicine will continue to revolutionize healthcare in America. The professionals in biomedical engineering (BME) can meet these two challenges by creating improvements in technology that will permit more efficient and higher quality healthcare to be delivered at a lower cost, as Dane Miller, CEO of Biomet, pointed out.

The US share of the world market for medical device has been held to 45~49% in recent years. Within a span of 30 years, China has grown its GDP by 30-fold. Most PCs, Notebook computers, iPhones etc., are now manufactured by the alliance of companies in America, Taiwan and China. Because of the increase in the purchasing power of their citizens, Brazil, Russia, India and China (BRIC) will become big consumers of medical devices and pharmaceutical products.

Physical disabilities, diabetes, chronic pulmonary obstructive disease, end stage renal disease, and deadly infectious diseases are too prevalent throughout the world. It is the responsibility of everyone to improve the existing medical technology and create innovations to help the billions of people in the Third World. The medical device and pharmaceutical industry must find a way to produce affordable medical technologies and products to meet the desperate need for better healthcare for the world.

As Peter Katona stated, “BME is a profession that requires knowledge in diverse areas, welcomes risk, poses major challenges, and offers substantive rewards. Thus, it is a natural home for entrepreneurship”. This description of BME fits well with Robert Nerem’s projection that “The future for biologically-based engineering is exceedingly bright, but one that more than likely will be much different than what any of us can today envision.”

To achieve diversity, which is essential for BME students, many BME education programs in the US have already overwhelmed their undergraduates with courses in engineering, biology and medicine. A student survey of career choices indicates that BME undergraduates want

to gain business and entrepreneurial experience so that, in ten to twenty years following university graduation, they can be entrepreneurs, their top career choice, building their enterprises in medical technology which can resolve or alleviate the medical problems of their friends, relatives and patients.

Judging from the enthusiasm of, and the extra effort spent by, students at the University of Virginia and University of California, San Diego, in taking the “BME Entrepreneurship” course, the author sees that many of them have already taken a giant step toward their entrepreneurial careers. They have spent a great deal of effort to work out a business plan for the course that tells their class how qualified they are as entrepreneurs, how critical the need to resolve the medical problem is, how their product uniquely resolves the problem, and how their product can generate profits for their companies. Support for these assertions is gathered from interviews by these students with many medical and engineering experts.

This book has been written for these students and others who want to become BME entrepreneurs. Sixteen of the chapters were written to address the following five questions and related issues:

- What is required to become a BME entrepreneur?
- How can innovation or improvement be demonstrated to benefit patients while generating profits for the company?
- Who are the BME entrepreneurs whose engineering and business ingenuity led them to develop successful enterprises?
- What are the unique challenges and opportunities that BME enterprises will face?
- How do you globalize your enterprise and improve your invention for the delivery of affordable healthcare to the Third World?

This book first introduces BME as an engineering profession and highlights the innovations that have contributed to the improved healthcare of the Twentieth Century. It concludes with two chapters on how to invest, after your enterprise has achieved success, in you, your company, society, the nation, the people and the world, and how to succeed in biomedical engineering entrepreneurship with really trying (by Shu Chien).

To all of you who want to become great entrepreneurs for the worldwide betterment of healthcare, the author wishes you the best.

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