INTRODUCTION

Why do I think this book might be useful?

This is the most exciting time in history to become a scientist or engineer. Our imagination is often our limit to what we can discover or do. Our achievements enhance the world around us at a dizzying pace. New diagnostic tools, medicines, new materials including those made by nanotechnology, miraculous computers, lasers and electronic devices are transforming our world. But America is not producing enough scientists and engineers to maintain our position as world leaders in science and engineering. Many factors affect the number of Americans entering STEM (science, technology, engineering and mathematics) fields. Numerous studies have emphasized the importance of attracting STEM professionals from every group in the country. We cannot afford to lose the talents of women, of African Americans, Hispanics, Native Americans, or those with physical challenges. In fact, we can’t afford to lose the talents of any Americans who could become STEM professionals. We must use a variety of strategies to help people with the desire, intellectual ability, creativity and perseverance to continue to gain the education to become the next generation of leaders in STEM. A number of programs provide opportunities for undergraduates to conduct research or gain practical real life experiences. Graduate schools and organizations provide salaries or stipends to support advanced level study, especially at the Ph.D. level.

Some of you have access to people who can guide you through the process of applying to graduate school. However, many people using this book may not feel they have sufficient guidance to move to the next level of their education. A lot of people in STEM careers do not come from families with a history of advanced education. Some of the outstanding Ph.D. students at my institution are first generation high school graduates.

This guidebook has been developed to help undergraduates understand and prepare for entering graduate school in the sciences or engineering. The elements presented here have been developed over the past 17 years that I have worked with undergraduates, Ph.D. students and post-doctoral fellows through the Graduate School of Biomedical Sciences of Baylor College of Medicine. The undergraduate majors of my students have spanned the spectrum of STEM, including biology, chemistry, computer science, engineering, mathematics, physics and every other imaginable area. Like research projects, this material has evolved - from pointers provided to puzzled students into more formal workshops, many of which have been presented a
number of times. Thanks to funding from the National Science Foundation (NSF HRD 9906394), these pointers have been assembled into a guide that I hope will make it easier for students to apply to and be accepted by the graduate school of their choice. The guidebook includes several sections, each useful at a different point in your education. You may come back to different sections at different times. Some sections refer you to other specialized resources.

The first section provides pointers on making the most of undergraduate research and work experiences. I’ve worked with more than 1,600 students in our SMART summer undergraduate research program and helped many of them apply for Ph.D. programs. Practical, real-life experiences are prized by graduate school admissions committees. Hundreds of research/work opportunities are available for resourceful undergraduates, but you have to maximize the impact of your experience.

The SMART GRE prep workshops were developed in a very unexpected way. I saw too many promising scientists who were not accepted by the graduate schools they wanted to attend because of their GRE scores – and only their GRE scores. I took GRE practice tests myself and tried to provide pointers and encouraged students to create study groups – but it didn’t help. So, when I identified a NSF Gender Equity grant with a more flexible budget than for typical summer research programs, I asked for funds to have a GRE prep company do diagnostic testing and teach a prep course. The review panel decided to fund the grant, but eliminated the funding for the GRE course and had the audacity to recommend that I teach the course. I said some very bad words about the sanity and intelligence of the review panel. What does a biochemist, a molecular biologist know about teaching GRE prep? How could I possibly find the time to do one more thing? Then I cried and went to bed. When I got up the next morning, I decided that they had given me $95,000 to help students enter graduate school, so I’d try to teach GRE prep, but I needed help. I was fortunate to “bump into” a BCM student who decided to complete a master’s degree, but not a Ph.D. Tina Corkran had helped her mother teach SAT prep. Tina began working with me to develop GRE prep workshops as soon as she finished her thesis, which wasn’t until the summer had started. Some days we were making up exercises as we entered the room. But, we had remarkable results with our first group of 10 students. Their scores improved an average of 370 points between the first and last practice exams! We continued to develop workshops as we found other donors who recognized the importance of helping students do their best on the GRE. Laurie Connor, Ph.D. joined the team after I acquired a major grant from the NSF to test our model at five women’s college campuses. Over the years the changing structure and content of the GRE has
been a great challenge. Our guidebooks for students and faculty have been updated a number of times to keep pace with changes to the GRE. But the SMART Program and other campuses have demonstrated that students can improve their scores through workshops and individual study. Many students improved their scores by 200 points or more using the strategies outlined in this book. Our hope is that the information in this book will provide inspiration and guidance to help you do your best on the GRE and reach your career goals. But the moral of the story is that as scientists and engineers we learn to be problem solvers and you never know what problem you’ll find yourself solving next.

One section of the book includes information from some of the “Thriving, Not Just Surviving, as a Scientist” skills workshops I present at BCM. In the early stages of my career, I spent a lot of time trying to find out how to do things right. As a scientist/educator I created a series of workshops to provide advice on developing the practical skills we need as scientists. The workshops that are of greatest relevance to undergraduates are included in this book. Hopefully, the pointers in this book will help you do a good job and save time and stress. We love science or engineering, but having a life is important, too.

I developed workshops on applying for graduate school for the undergraduates and technicians working at Baylor College of Medicine. Graduate schools are looking for American educated students who have taken good advantage of their opportunities and can relate their experiences and preparation in knowledgeable language. Understanding and preparing for the application process can reduce the stress you feel and result in greater opportunities to expand your knowledge and skills in the environment you chose.

Good luck as you continue your education. The lives of people around the world have been enriched through science and engineering. New discoveries and applications of knowledge will continue to develop – as long as we have people who are willing to gain the education and persevere to make today’s dreams and crazy ideas, tomorrow’s realities.

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