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Engineering our Future: The Search for Solutions

By Manoj Chopra
UCF Forum columnist

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We are bombarded on a daily basis by both old and new problems – crises that have either been many years in the making or have risen up almost instantaneously. Where should we look for solutions?

The answer is simple: engineers!

Engineers are creative minds who can look beyond political rhetoric, stale theories and magic potions to gather observations, discern patterns and draw conclusions but then take it one step further: develop solutions.

We must rely on engineers to shape the future of our world – even if I say so myself, an engineer.

It may seem like all doom and gloom if we only listen to the talking heads, political pundits and, to some extent, some of the new 21st century journalists and news sources. We are often left in a confused state as to what is the true state of our planet. And is there someone doing something to improve things?

Engineering is the application of science and the extremely powerful tool called mathematics, in order to solve problems. Technology is the manifestation of these solutions into tangible products – such as machines, sensors, monitors, nanoparticles, structures, aircrafts, space vehicles, chemical-treatment plants, to name a few. These solutions are aimed at enhancing our quality of life, ensuring safe and comfortable movement or improving our health.

The average life span was 37 years if we look 300 years back into history. Today, it is approaching 80 years due to advances in medicine and technology. Safe transportation, clean water and healthy food are now readily available in most parts of the world and often taken for granted.

There are no areas of life that are untouched by engineering solutions. This century has further crystallized the role of the engineer in making our lives better through new areas

of research and development such as nanotechnology, bioengineering and prosthetics, alternative energy and reusable space vehicles. We are making tremendous strides in computational power and ease of use of computer technologies. The biggest leap, in my opinion, has been the use of data to analyze and solve problems. The rapid rise of data-driven decision making and the availability of information on the internet is the true headline of this century.

The negative effects of these advancements should not be brushed aside, lest we do not learn from our mistakes and repeat them. For instance, the threats posed by the depletion of resources, reliance on non-renewable sources, poor design and construction leading to catastrophic failure of systems and components, and the inadequate planning for changes to our climate.

Now, let me stress, no matter if one believes that global climate change is a result of human activities or not, it is the responsibility of the engineer to find SOLUTIONS to this problem. In any case, whatever the debate, finding innovative solutions that reduce the impact of humans to this planet is the right thing to do.

One of my strongest disappointments with the global-engineering community has been the response to people in areas of the world that are still struggling with the basic necessities needed for their survival – clean water, electricity and proper sanitation. The advancements we make in developed wealthy nations to move technology from version 3.5 to version 4.0 of any product or application must be accompanied by an equal emphasis on introducing basic life-saving solutions to help mankind in these underdeveloped or strife-torn areas. While there is technology that can easily destroy these areas, we must also help build their lives.

Engineers bear the burden of improving the lives of those who live in abject poverty or have been impacted by conflicts. Thus, engineering education must include social and cultural awareness with a global outlook.

To a large extent, engineering is not very different from medicine in the sense that it also involves significant personal responsibility, requires innovative solutions, relies on ever-advancing technology and, most importantly, makes decision that have life and death implications.

Engineers have the burden to collaborate closely with their colleagues in science as well as the humanities, and look to predict the problems of the future. The solutions to these problems will need to be quick and decisive.

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