What a Difference a Decade Makes for Science and Technology

By Mel Schiavelli**

The past decade has seen incredible advances and breakthroughs in science and technology leading to new inventions and innovations already having an impact on the quality of our lives and others that will lead to more breakthroughs in the future.

For example, in January 2008, a group of astronomers using NASA's Swift X-ray satellite to study data from a month-old supernova remnant in a distant galaxy. In a case of "extreme serendipity", the same galaxy produced another supernova the astronomers were able to study “right as it happened” 90 million light-years from Earth, making it the first time that astronomers caught a supernova “in the act.”

Many people count the 2004 launch of the social networking site Facebook as one of the great applications of technology that will forever change how we communicate, market and campaign for public office. The Nov 19th, 2007 release of the Kindle and other electronic book readers will have far-reaching effects on how we view books and newspapers. The 2004 unveiling of Nintendo Wii revolutionized the home gaming console industry, allowing players to go beyond merely playing video games and become a part of the game. Satellite radios, flat screen televisions and internet telephone service are more commonplace in our homes, while hands free calling, turn-by-turn navigation, and remote diagnostic systems are becoming standard in automobiles.

The portable media player the iPod launched on October 23, 2001. It altered the landscape for portable audio players. Its cousin the iPhone went on sale in June of 2007. The iPhone with its more than 100,000 applications has changed social interaction, health care, education, and most importantly, how we communicate.

Less than two years ago, a 30-year-old woman with tuberculosis was given a new section of windpipe created from her own stem cells in an operation that could revolutionize surgery. She became the first person to be given a whole organ tailor-made for her in laboratories across Europe. The 2008 event is considered one of the greatest examples of regenerative medicine. That same year also marked the first time doctors were able to sequence the entire genome of a cancer patient and read the genetic code of her diseased cells, allowing them to pinpoint the exact mutations
responsible for the illness. Not only is this giving cancer researchers a better understanding of the disease, it is bringing the medical community a step closer to offering personalized health care.

Advances in speech recognition, voice control and text-to-speech are changing our home computers and opening new opportunities for people with visual impairments. The human-computer interface (HCI) continued to make great strides and it will remain an emerging field that melds software engineering, software human factors, computer graphics, and cognitive science. HCI now incorporates broader social science, networking, media, information management, and artificial intelligence and it promises to change computer and computing technology in the decade ahead.

These are all “world changing” breakthroughs but I believe most significant in the past decade has been the resurgence of, and investment in, the science, technology, engineering, and mathematics (STEM) disciplines.

While an overwhelming majority of Americans responding to the 2009 Pew Research Center survey say that science has had a positive effect on society and quality of life, fewer Americans today mentioned scientific advances as one of the country’s most important achievements than did so a decade ago - 27% today, 47% in 1999. Science and technology lost cachet over the past 10 years. For most of the past decade the nation overlooked the great discovery made by Central Pennsylvania in the mid-1990s: the STEM shortage. The rest of the U.S. seemingly did not “notice” the declining numbers of STEM-educated graduates until 2009. But now it seems that hardly a week goes by without one state or another announcing a new STEM initiative. The nation’s re-discovery of STEM culminated in President Obama’s call to boost student mastery in STEM subjects and is beginning to re-energize prompted the K–12 community.

Central Pennsylvanians have seen first-hand how investments in STEM can pay dividends as we witnessed the opening of new educational institutions focused on science and technology, the opening of the Hershey Center for Applied Research, the creation of new technology and science focused companies in the region, the investments in green technologies made in the construction industry, and the transition of government agencies to e-commerce. As a scientist and academic leader for the past 40 years, and having spent the past 9 of them in Harrisburg, I have watched with
a growing sense of excitement and hope as science and technology have become a significant part of our region’s economic development agenda.

As we seek out the next scientific and technological advancement we must remember that strengthening America’s role as the world’s engine of scientific discovery and technological innovation is essential to meeting the challenges of this coming decade and the century. Continued investment in STEM-based initiatives will bring forward new innovators and new inventions in the next decade.

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