I teach and do research at work, and when I’m not working, I enjoy traveling and watching sci-fi movies. I’m amazed that there is a parallel when I compare my traveling experiences with watching sci-fi movies, and the combined experiences have helped me gain insight into my work.

The Changing Landscape of China

China has a population of 1.3 billion or one-fifth of the world’s population. It is an enormous consumer market with, at the same time, a huge labor force. We read about rapid economic, social, and political changes in China from newspapers, magazines, and the Internet. Major corporations, including companies such as Microsoft, GM, and Johnson & Johnson, entered this market to grow their businesses. In order to transform from a low-tech, labor-intensive workforce to a high-tech, knowledge-based workforce, China is earnestly seeking partners worldwide to improve its educational system.

As a part of the international outreach effort, RIT signed a cooperative agreement with Shanghai Publishing and Printing College (SPPC). Faculty members from RIT’s School of Print Media are invited to teach graphic media and printing technology courses for three weeks in the summer. SPPC covers travel expenses, housing, and offers a stipend. In addition, the host will pay for a weeklong trip to permit faculty travel anywhere in China.

I was born in China, grew up in Taiwan, and have been living in America since I became a naturalized U.S. citizen in the 1970s. I speak Mandarin fluently and can identify myself with Chinese culture. In addition to sightseeing, I’m interested in learning more about China so that places become than just names on a map, and I want to meet the people there and to experience different ways of living.

Teaching in China

I taught at SPPC in Shanghai for two consecutive summers. Teaching in China presents a number of challenges that are different than teaching in the U.S.

In the U.S., faculty determines the class size. In China, I was at the mercy of the school administration. In 2004, I taught 180 students in an air-conditioned classroom with a computer hook-up and an overhead projector (Figure 1). This year, my class size was only 33 students. Due to the difference in class size, there was a significant improvement in the quality of student/teacher interactions.

English is very much the international language in the Internet age, but English is a second language to students in China. In the beginning of my teaching, I was faced with the question, “Should I instruct my class in English or in Chinese?” I asked the administration, and the answer was to teach them in English, but when I asked the class, the students wanted both.
A straight line is the shortest distance between two points. This is also true in the selection of language when two parties want to communicate effectively. If the goal of teaching is to transmit knowledge, then speaking Chinese to Chinese students makes sense, because the communication is most direct. If the goal of teaching is also to learn English, then teaching students how to document laboratory reports in correct English and with logical structure also makes sense. Thus, I adopted a bilingual strategy in my teaching in China.

The SPPC school administration requires a textbook and a set of course notes. No hands-on laboratory assignment is required. Most SPPC faculty members teach with a marker and a whiteboard, and students learn mainly from lectures and textbooks. Consequently, learning outcomes are measured by how well students memorize the materials covered, not necessarily how well they understand them.

I decided to experiment with “learning by doing” to see if I could change the learning paradigm in my classroom. I organized my students in groups of three and gave them homework assignments. After a lecture on an overview of major printing processes to a freshmen class, I asked the students to collect printed samples on their own, identify the printing process used in producing them by means of photomicrographs, and document these findings in lab reports. Many students were excited about the opportunity and were enthusiastic about finding these samples. They had no problem finding gravure-printed and offset litho-printed samples, but had difficulties finding flexographic-printed samples.

I suggested to the class that they should take a closer look at pressure-sensitive labels found in many household items or packages of fast-moving consumer goods—e.g., candy wrappers, snack bars, etc. It turned out that these suggestions were not helpful because these items were also printed by gravure in China. I was able to find a United Airlines’ snack pack, printed by flexo, to show them.

Students noticed the differences in my teaching methods right away. Many of them had to struggle with terminology first, some learned the importance of asking questions, and some would spend the entire weekend working on their lab reports. One student summed it up best, saying, “It took me more time and efforts in Professor Chung’s class, but I learned the subject well.” Interestingly enough, it was the same comment I receive from students at RIT.

Traveling in China
An effective way to experience China, a country with a diverse geography and culture, is to travel, which we did by a combination of air, train, and car. In 2004, we went to Yun-nan province in the southwest of China, and in the summer of 2005 we visited the northwest of China. I shall limit my traveling experiences on the Silk Road only.

The Silk Road encompasses vast territories and separates China from Europe. Much of the region is taken up by desert, and there are a number of oases with water located not too far below the surface. The Silk Road’s eastern end began in Xian and extended all the way to Rome, Italy. Western merchants would travel the route to trade gold, ivory, and precious goods for silk.

We flew from Shanghai to Xinjiang province and began our Silk Road journey from Kashgar and moved eastward (Figure 2). Kashgar has a history of more than 2,000 years with a strong Islamic culture and is an important hub on the Silk Road. The majority of the Kashgar population is Uygur. They resemble Middle Easterners more than Chinese (Han), but the locals speak Mandarin, use the same currency (RMB), and are governed by Chinese laws.

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Moving along the Silk Road, Urumqi is the capital of the Xinjiang province. The word “Urumqi” means “beautiful pastures” in Mongolian. The city itself is very modern, and I was surprised to find a free Internet connection in my hotel room.

The area outside of Urumqi is vast. Nothing much grows above the ground, but underneath the ground, it’s full of minerals, including oil. Divided highways stretch like straight lines from

Figure 2. Map of China with the Silk Road highlighted
one city to the next. We went boating in the Heavenly Lake, located at the top of the Heavenly Mountain and visited the local bazaar where merchants gathered. Lamb is the local cuisine, wines are made from local vineyards, and silk rugs of different designs are still made by hand.

Dunhuang, a city in the Gansu province, is famous for its cave paintings and sculptures of Buddhist art. Emperor Han Wudi founded Dunhuang in 111 BC to ensure the control of the trade routes to the western region. The ancient traveler leaving China would pass through Dunhuang before braving the many hazards of the journey westwards through Xinjiang. To pray for a safe journey, merchants donated money to local artisans to build Buddha artifacts. The Mogao Grottoes (Figure 3) contain priceless paintings, sculptures, and Buddhist scriptures. For several hundred years after the collapse of the Han Empire (206 BC - 220 AD), the area was subjected to successive waves of invasions. Luckily, the Mogao Grottoes collection was left unharmed to this day.

Figure 3. Mogao Grottoes contain priceless paintings and sculptures

Xian is the capital of the Shaanxi province. During Xian’s 3,100 years of history, 13 dynasties such as Zhou (1040 BC), Qin (247-206 BC), Han (206 BC-220 AD) and Tang (168-907 AD) placed their capitals here. As such, Xian enjoys equal fame with Athens, Cairo, and Rome as one of the four major ancient civilization capitals.

The Qin dynasty’s achievements are numerous. Language and writing were standardized for consistent communication across the country. Currency became standardized as a circular copper coin with a square hole in the middle. Measurements and axle lengths were also made uniform to enable transportation by horse carriers. The Great Wall was connected in the north to protect against invasions. Xian was also famous for the terra cotta army at the burial site of Emperor Qin Shi Huangdi. The army consisted of more than 6,000 pottery soldiers protecting the tomb (Figure 4).

Despite all of these accomplishments, Emperor Qin Shi Huangdi was not a popular leader in China. He banned books and writings of the great philosophers and executed more than 400 dissentient scholars during his time.

Carbon black was the first pigment discovered to make black ink. Tsai Lun invented paper in 105 AD. Bi Sheng invented Chinese movable characters in 1051 AD (ahead of Gutenberg who invented movable alphabets in 1450 AD). It was the availability of ink, paper, and movable type that gave birth to the printing industry in China. How did ancient Chinese scholars study before the invention of printing? I find the question intriguing.

The answer presented itself when I was in the middle of more than 2,000 inscribed memorial tablets in Xian’s Museum of Stone Tablets. The oldest stone tablets can be traced back to the beginning of the first millennium. To ancient scholars, variations of these characters were calligraphic art. They also served as the source of originals. To make a reproduction, a film of ink was applied to the surface of the stone, then a piece of paper was placed on top of the inked surface and pressure was applied, causing the ink transfer to the paper. The result was a negative image of the stone carving (Figure 5). Without stone rubbing, making a duplicate required manual copying, which was time-consuming and error prone.
The Sci-Fi Connection

“Long, long ago in a galaxy far away...” is a good starting phrase for a sci-fi movie. And it’s a way to express the possibility that we may find ourselves in a different time and a different place where past experiences no longer apply.

I recently saw an episode of Star Trek where Jean-Luc Picard, captain of the starship Enterprise, and his crew took me into the future where people were “beamed” from one location to the other; Lieutenant Commander Data, an android who continually tried to be more human, was experiencing an “emotion” chip; half-robot Borg tried to sabotage a rocket flight; and the success of any endeavor was no longer measured in financial terms.

The original idea for Star Trek, which began in the 1960s, was to model itself after the hey-days of America’s western frontier with the mission to “explore strange new worlds.” It illustrated the sharp contrast between tradition and modernity, between authority and democracy, between capitalism and colonialism, as well as between religion and science. Michele and Duncan Barrett pointed out in their book that the continuing voyage of the Enterprise is a quest, not for new lands, but for new answers to the question, i.e., “What does it mean to be human?”

Back to the Present

Traveling to the Silk Road was very different from watching an episode of Star Trek, but they had a similar effect on me—they made me think about why we do what we do, when do we begin to change what we do, and do we lead the change or are we driven by it?

Traveling on the Silk Road took me to the past. I gained a deeper appreciation for things we take for granted—for example, books. A book is a collection of information or a body of knowledge. It took a long time to develop the printing technology so that everyone can afford to have books or access to information. As a matter of fact, the invention of movable type helped transform society from illiteracy to literacy. Will we continue to value the importance of books beyond the Internet age? Should the printing industry address the making of electronic books?

Watching sci-fi movies takes me to the future. There is an overwhelming presence of automation and a diversity of living species. There are so many things in the “strange new world” that can be explored. But what is most important in life? How is success measured at the individual level, at the organizational level, or at the national level? If money is no longer the measure of success, then what is? I suppose there is no single answer that can satisfy us all. Nonetheless, it’s important that we ask the question and keep searching for an answer.

At work, I ponder the role of print media and its transformation in the digital age. Today, digital imaging technologies have simplified prepress workflows. They have created an on-demand printing market that has ended the need to print encyclopedias.

Looking at the gravure printing industry today, we see that gravure-printed products are consumed by society. This is because the gravure process has gone through many generations of technological changes to meet market demands.

When looking at the future of gravure printing, we cannot afford to leave the following questions unanswered: Have consumer behaviors changed over time? What are the next breakthroughs needed to keep the process attractive to print buyers? How can we continue to keep the process economically viable?

Before I can travel the way the Enterprise crews do, I’m optimistic about finding the answers and meeting these challenges.

Bob Chung is a professor in the School of Print Media, Rochester Institute of Technology. Bob was named the RIT Gravure Research Professor in 2004 with the charge to explore research, develop curriculum, and promote career opportunities in gravure printing and the packaging industry. He is interested in your comments regarding this article and any suggestions that you may have to further gravure research and scholarship and can be reached by e-mail at rycppr@rit.edu.