

My Journey
From Seaside Village to Space Exploration

"In the end, it's not the years in your life that count. It's the life in your years". - Abraham Lincoln (1809 -1865 AD), 16th President of the United States of America

"To what can human life be likened? Perhaps to a wild goose's footprint on snow. The claw's imprint is accidentally left. But carefree, the bird flies east and west.", "人生到處知何似，應似飛鴻踏雪泥。泥上偶然留指爪，鴻飛那復計東西。" - Su Tungpo, 蘇東坡 (1037-1101 AD), Chinese Poet, Essayist Writer, Painter and Calligrapher

Now that my memories have begun to fade, it is time to recall in writing the important moments of my life so they won't disappear like footprints in snow. My journey began with the love of my parents who gave birth to me, raised me, instilled in me righteous values and ethics. During my adolescent years, my elder sisters and brother protected, helped and guided me. Teachers in my schools educated me, developed my professional skills, as well as molded my characters. I wish to let my friends and colleagues know that I cherished the time we were together. I wish to let our children and grandchildren know how much I love them and how much joy they have brought me. If someday our children or grandchildren ever want to search for their roots, they will know where to begin. The most important theme of this memoir is to highlight part of my life and journey that I have shared with the love of my life for 51 years and it continues.

I was born into a chaotic China (中國). Many chaos in this once-great country with a long civilization were caused by the vicious invasions of the Japanese Army. The once prosperous Chinese economy had been in declination long before the Japanese invasions. To understand the chaos and poverty, one must trace their causes back to the history of China.

An Abridged History of China – the Land of My Ancestors

"China is a country so expansive that it exceeds the capacity of human spirits..." in the book "My Country and My People" - Lin Yutang 林語堂 (1895 - 1976 AD), Writer in English and Chinese, Translator, and Linguist

Although many pre-historical sites of early civilizations in the China domain had been discovered and dated back much ancient by archaeologists, the written history of Chinese people began about 2,000 BC. From the 3rd millennium BC, Chinese people emerged from many tribes living in the "central plain" into feudal states. The feudal states were nominally ruled by a common sovereignty called "son of heaven (天子)". The feudal states often fought one another for territories and populations. In 221BC one of the feudal states conquered all others and unified them into the empire Qin (秦 China in Latin)

The first Emperor of Qin named himself Qin Shi Huang (秦始皇, the beginner of all emperors). The name of the empire was known to Europeans through the peoples in central and western Asia. Although the Qin dynasty lasted only 17 years, the great country has been called China since then. In the two millenniums after Qin, there were several great dynasties or empires established on the East Asia plain known to the world as China. However, Chinese preferred to call their country “Central Nation” - the center of the world assumed by Chinese for a long time. From 2,000 BC on to the 16th Century, China flourished during several long dynasties of Han (漢), Tang (唐), Song (宋) and Ming (明). The Han Dynasty (206 BC – 220 AD) was considered the first golden age of Chinese history. It was the Asian counterpart of the Roman Empire. To this day, the majority ethnic group in China refers to themselves as the “Han People”. The culture and wealth of the Chinese people reached their pinnacle in the Tang Dynasty (618 – 905 AD). The Capital of Tang, Chang’an (長安) was the biggest and wealthiest city in the world at the time. During the succeeding Song Dynasty, the military strength of the Chinese empire declined significantly. However, technologies, literatures and arts in China continued to grow vigorously. Because of the declining military strength, China was conquered and ruled by the Mongols. Under the Mongolian rule, the Han people were brutally suppressed and discriminated. After near one century of the Mongolian rule, the Han people rose in revolts and drove the Mongols away. China was again ruled by an emperor of the Han people. Unfortunately, the emperors of the Ming dynasty (明朝, 1368 -1644 AD) inherited the absolutism, despotism and brutality of the Mongols. By the late-16th century, Chinese economy, military and culture under Ming dynasty had declined rapidly. After successive incompetence emperors and their corruptive and evil ministers, China was poor, weak and in chaos. Internally peasant rebellions engulfed the whole country. Externally, Manchu (滿州族), a frontier ethnic group of less than 1 million had developed into a formidable military power in Manchuria (now Northeast China).

In 1644, Manchu invaded and toppled the Ming dynasty. The invaders established the Ching (or Qing) dynasty (清朝). The insertion of more primitive Manchu blood made China strong and the empire expanded again. China conquered and annexed Mongolia (蒙古), Tibet (西藏), and Xinjiang (新疆) Uyghur (維吾爾), in the first hundred years of the Qing dynasty. But after the mid-18th century, the Manchu rulers of China were completely assimilated by the majority Han people (漢族, more than 90% of Chinese population) and lost their military prowess. Coincidentally, the 18th century was the apex of the age of Discovery and beginning of the Enlightenments in Europe and North America. China was isolated from the western world by the policies of the Qing Dynasty rulers. The country was oblivious of the advances in cultures and technologies. Rapid industrial revolutions made countries like British and France rich and dominant powers. The Europeans needed to export their industrial products and to import raw materials world-wide. They came to knock on the door of China. They wanted China to trade with them, including buying opium harvested by the British in India. When the Ching ministers turned

them down and barred the opium import, British sent her fleet to attack China. The British defeated China in the First and Second Opium Wars (鴉片戰爭). China had to pay large indemnities and cede territories (Hong Kong 香港 and Kowloon 九龍) to the British. Additionally, the backwardness of Chinese military, economy and education, as well as the incompetence of Chinese officials were exposed to the world. France, Russia and other European powers followed and took what they wanted from China.

Even a neighboring Asian nation, Japan began to kick China around. They defeated and humiliated China in the 1894 war (甲午戰爭). In the ensuing peace treaty, China had to pay a huge indemnity of 276 million troy ounces of silver (equivalent to \$5 Billion today) and to cede the island Taiwan (台灣) to Japan. China was called the “sick man of East Asia (東亞病夫)”.

These military defeats and diplomatic setbacks woke up the Chinese intellectuals. They realized that only through reforms of the whole military, political and education systems, can the misfortune of China be reversed. The young and weak Ching emperor was convinced to move on the path of reform. He promoted several junior, visionary officers to carry out the needed reforms. However, these reforms were against the interests of the senior conservative ministers still in power. They took their “grievances” to the ultimate ruler of China at the time, Empress Dowager Cixi (慈禧太后). With her ignorant permission and manipulative support, the conservatives staged a coup d’état that resulted in termination of the short-lived reforms, executions of the reformers, and permanent house-arrest of the young emperor. After the collapse of the ill-fated reforms within the Ching court, revolutionary reformers realized that overthrowing of the Chin government was the only way to save China. In 1912 the revolutionaries succeeded under the leadership of Dr. Sun Yat-Sen (孫中山先生), ended four thousand years of monarchical and feudal traditions. The Republic of China (中華民國) was established. Dr. Sun was called the “Father of the Republic 國父” by the people of China, just like Washington, Adams and Jefferson in the United States. He declared that all men are equal and led China in taking the first step towards democracy. One hundred and some years later, only in Taiwan has Sun’s goal of democracy been achieved. Two decrees implemented by Dr. Sun’s government did change the outer appearance and the mentality of Chinese people greatly. He abolished and banned the foot-binding practices that had pained and disabled Chinese women for hundreds of years. Another decree was to require Chinese men to cut off their pigtail. A shaved forehead combined with a pigtail on the back had been a symbol of conquest branded on Han Chinese men by the Qing emperors for almost 300 years.

Unfortunately for the revolutionaries, (later called Nationalists, 國民黨) Dr. Sun Yat-Sun’s government couldn’t command authority over the whole nation. In fact, most of the Republic of China was under control of several local warlords. The warlords, trying to expand their fiefdoms, fought one another endlessly. Dr. Sun passed away in 1925 with only a small part of his blueprint for China implemented. In 1926, the Nationalists,

led by Generalissimo Chiang Kai-shek (蔣介石委員長) began their “Northern Expedition”. They defeated the warlords and unified the nation nominally in 1928. However, internal and external problems continued to torment China. Shortly after the unification, Japan attacked and occupied the resource-rich northeast China provinces in 1931. Weakened by the civil wars, China was unable to resist at the time. Deeper hatred against Japan was buried in the mind of Chinese people.

China, especially the rural areas that were ravaged by the civil wars, had become a hot bed for another group of revolutionaries. They called themselves Communists (共產黨), naming after, and taking aids and sometimes orders from the Soviet Union Communists in Russia. They formed the Chinese Red Army (紅軍) to fight against the Government Army (蔡國洋) after the superficial unification by the Nationalists. In the initial few years, the Red Army were defeated in south central China and had to flee for a long way to reach northwest China. When Generalissimo Chiang was just about to finish the Communists off, he was abducted by two of his subordinates co-conspiring with the Communists. To gain his own release and safety, Chiang was forced to declare in public in 1936 that all Chinese, including the Nationalists and the Communists would unite to fight against the Japanese aggression. Thus, the Communists had gained a foot-hold in Yen ‘An (延安). The truce between the two parties gave China some respite for urgently needed reconstruction. It didn’t last long, only for less than 1 year. Japan started a full-scale invasion into China in 1937. They attacked Beijing (北京) and Shanghai (上海), the two largest cities and a lot of other places, China were in a great turmoil again.

Under the leadership of Generalissimo Chiang, China stood alone and fought against Japan from 1937 until Dec. 7, 1941, when Japan attacked Pearl Harbor. Although Japanese had occupied large regions of China, the Chinese army under Chiang continued to fight and resisted. In the Chinese history, Chiang should be credited and respected for his determinations and perseverance. Chinese fortune turned as they gained a powerful ally in the United States after the Pearl Harbor attack. The alliance eventually won the victory of the Pacific War in 1945, with Chinese war casualty amounted to more than 20millions of soldiers and civilians. Taiwan was returned to China after the victory, and the Chinese people were again expecting a respite for reconstruction after WWII. One more time, the cruel fate fell upon China. Chinese Communists, who fought very little against Japanese during WWII, had grown into a force challenging the Nationalists for governing China. The relative strengths of the two armies had already been reversed. The Nationalist army (國軍) had been decimated and exhausted in fighting the war against Japan. The Nationalist Government (國民政府) was also plagued by corrupted officials and infested with Communist spies. In 4 years, the Communists defeated the Nationalists and controlled the whole mainland China (中國大陸).

My Roots and My Birth

“There are only two lasting bequests we can hope to our children, one is roots, the other, wings.” - Jonathan Wolfgang von Goethe (1749 - 1832 AD), German author and statesman

I was born on October 4, 1942 in a rural village in Putian County (莆田縣), Fujian Province (福建省), in the mainland China. My parent named me LIN, Chin-Houi (林慶輝), because my birthday was close to the National Day of the Republic of China, October 10. My name in Chinese literally means “celebrating the brilliance”. In 1942, World War II was still being fiercely fought. Japanese had invaded and occupied large parts of China, including the County seat of Putian where my family lived before the occupation. To escape possible harm by the Japanese, my family fled from the County seat to the village where my father grew up. In the village, people kept their dates with the traditional Lunar Calendar, instead of the Western Calendar. My parents did not register my birth date with the Government until we moved to Taiwan 7 years later. Even then my father didn’t go to the registration office himself. He sent his office assistant to do the job. My father gave the office assistant my birth date in the Lunar Calendar. At the registration, when the government clerk asked for my birth date in the Western Calendar, the office assistant made a quick but erroneous conversion. He registered my birth date as September 16, 1942. That was it; my official birth date has been stuck with that day in all subsequent governmental documents from school records to passports. When I made the correct conversion myself years later, it was October 4, 1942. Only 18 days apart from the date in official records. At least the records had the year right. We stayed in the village until the war was over. My homeland village and County are on the southeast coast of China, just about 100 miles across the strait from Taiwan where we moved to, 7 years later.

My father, LIN Wei Wuan (林維完, born in 1901) was the first college graduate of his family. He graduated from the Beijing Branch of the Jiao-Tong (Communication and Transportation) University (交通大學). He was one of the first groups of native-trained Chinese telecommunication engineers. His teachers were either Chinese who went abroad to study telegraph and telephone or engineers from western countries. After his graduation, he went to work for the Telephone and Telegraph Bureau (電信局) of the Chinese Government. He worked for the Bureau for more than forty years until his retirement in 1963. He was one the few engineers who could read English manuals of the equipment bought and used by the Bureau. He worked and lived with my mother and their children in the largest city of China, Shanghai (上海), until the Japanese invasion in 1937.

When Japan invaded Shanghai, he was ordered to move with the Chinese Government to the hinterland to keep on fighting against the Japanese. At the same time, my mother, my sisters and brother were sent back to live in our hometown, Putian. It was a long, tortu-

ous and dangerous trek for them. In the course, one of my elder sisters was fatally trampled by refugees fleeing a Japanese air raid. Of course, this all happened before I was born.

During the eight-year war, my father took leaves every year to go back home visiting mother and family. But when I was born, he was thousands of miles away working on his job. After the Allies and China won the hard-fought World War II victory over Japan, the island Taiwan, was returned to China. My father was a member of team that went to Taiwan to manage the Telegraph and Telephone facilities in the island. Before being repatriated, the Japanese managers had cast doubt on Chinese abilities to keep the facilities running. My father's team proved the arrogant Japanese wrong again. After the recovering work, he returned to our hometown to set up the first telephone network in the area and ran it until we had to escape from the Communist Army. My father was a frugal man with respect to money as well as words. He rarely spent money for himself. Most of his earning went to supporting the family or savings in the bank. Like most men of his era, my father rarely helped around the house. He was a good husband in his era because he did not drink, gamble or have another woman. He never taught me in words how to behave, how to study or how to do my job. He taught me by setting an example of honest, reliable and efficient engineer as well as an example of traditional Confucians with self-restraint, gentle manners and a kind heart.

In the first few years of my life, my family lived in my father's home village supported by the rents collected from the farmland we inherited from my grandfather. My paternal grandfather was a rural school teacher, himself a descendent of farmers and peasants. The pattern of my family advancing in social classes was typical in China for thousands of years. Peasants saved money to buy land; land-owning farmers saved money to send their children (boys) to schools. Once educated, the children would be qualified for non-farming jobs with higher incomes. They in turn sent their children to be better educated.

My mother's name was LIU, Xiu Rong (劉秀榮, born 1903). She was born to a prominent family in Putian, the same County as my father was from. She was the only child of her parents. Although her father passed away very early, her mother could maintain a big household with several servants to cook and clean for us. My mother told me more than once that her uncle was the Speaker of House of Representatives of Fujian Province (then population about 20 million) in 1920's. My maternal grandmother inherited sizable tracts of farmland. One of the few things I remember of my early childhood was that peasants came to our house to pay rents with rice crop to grandmother. The worth of paper bills was less than the paper they were printed on due to rapid inflation in China at that time. Instead, rice was the real currency. People carried bags of rice to markets to buy other life necessities. Even my siblings' school tuitions were paid with loads of rice carried on bamboo poles. Other acceptable currencies of trades included silver coins and gold. After we moved to Taiwan, we lost all those farmland and rents. I remembered

that my mother carried a few small gold bars and rings in the pockets hand-sewed to her waist band. Those were all the valuable belongings of our family when we fled. After we moved to Taiwan, my mother had to do most of the house chores by herself. She didn't allow either of her boys into the kitchen, because she insisted that kitchen chores were women's job. She was a traditional Chinese woman, reserved and soft spoken. She rarely ventured out of our house except going to the market to buy meats and produces. My mother took care of her children meticulously and tirelessly. I still remember that on every school day, she would get up early to prepare the breakfast for us and then woke us up. The best foods she cooked were always reserved for my father and boys. I also remember that a few times before we were married, Jen-Ching, my future wife came over to dine with us. My mother would cook the meals but would not join us at the dinner table. Jen-Ching felt very uncomfortable about it because she was raised to respect her parents equally. But my mother persisted in eating after we finished. My mother often worried about that some things would go wrong, especially the safety of her children. I inherited some of the anxiety genes. I could recall the mixed feelings of pride and anxiety in her, when she saw me off at the airport on the day I flew to America for post-graduate study in 1966. I didn't know that farewell was the last time I saw her. In late 1970, she was gravely ill. She forbade my family to inform me of her illness, because Jen-Ching was pregnant at the time. She didn't want us to go back to see her. Not until after Alex was born in March 1971 was I told of her passing. I could never repay my mother's sacrifices and love. Not at her bedside when she passed away was the saddest regret of my life. All I could do is to live a life that continues her love and kindness.

I have 6 siblings, 5 sisters and one brother. I am the youngest of the 7 children 17 years apart in ages. We lost one sister fleeing from the Japanese invasion. Under pressure from his extended family, my father let his friend adopt another sister. The rationale, as I could call, was that my parents had too many girls. My mother was heart-broken about it. She wept every time she talked about the loss of two daughters, one to the war and the other to adoption. Later, I also learned that the sister was adopted as a child-bride for the family. A child-bride had to work like a servant before she reached the age of matriculation of 13 or 14. It is inhumane as we look at the adoption today. But who am I to criticize my parents about what was considered normal in rural China in the 1940's?

I really don't remember much else about my early childhood. I am not even sure if I went to school in my hometown. I was taught by my elder siblings and could read some Chinese characters, including my name. However, I was taught to read them in my hometown dialect, Hing-Hua-Gu (興化語). The dialect, quite different from the Mandarin Chinese (國語), is still spoken as mother tongue by two and half million people now living in Putian and another County in China. They only account for less than 0.2% of the total Chinese population; the dialect is also spoken by some Chinese diasporas living in Southeast Asia and North America.

Beautiful Island Taiwan – Homeland of My Heart

“Wherever gives solace to my heart is my homeland. (此心安處是吾鄉)” - Su Tungpo 蘇東坡 (1037-1101 AD), Chinese Poet, Essayist, Writer, Painter and Calligrapher

Taiwan is a large island (36,000 square kilometers) just about 100 miles across the Taiwan Strait from the Chinese mainland. The aborigines of Taiwan are ethnically related to those of the maritime Southeast Asia. Although the island was mentioned in Chinese history books written in the 6th Century, no significant emigration of Han Chinese from the mainland took place until the late 17th Century. Before then, Portuguese had “discovered” the island, recorded in their maps and named it “Ilha Formosa”, the beautiful island. Dutch settlements were established in the island in the mid-17th century. At the end of the Ming dynasty, a local lord in Fujian Province, Zheng Cheng-Gong (鄭成功, sometime referred as Koxinga 國姓爺) was unwilling to submit to the Manchu conquerors. He led his troops and large groups of Han Chinese from Fujian (福建) and Guangdong (廣東) to move to the island. Zheng blockaded the Dutch settlements and eventually forced them to leave. Zheng and his heirs, although maintaining nominal allegiance to the Ming dynasty, ruled Taiwan like an independent kingdom for more than 20 years. In 1683, a fleet of Qing dynasty crossed the Strait, defeated Zheng’s grandson and annexed Taiwan. The Qing government ruled Taiwan as a part of China for more than 200 years. During this period, Han Chinese had settled in almost all plain regions in Taiwan, drove the aborigines into the mountains. After the 1894 defeat, China was forced to cede the island to Japan. Japanese ruled Taiwan for 50 years as a colony until they were defeated in WWII. The Republic of China recovered Taiwan and administrated it a new province, albeit the smallest. The Nationalist Chinese government never would have thought at the time that they had to flee to Taiwan 4 years later.

By the time I was 7-year old, drastic changes took place for the most of Chinese people. The Chinese Communists were taking over China in 1949. The defeated Nationalist Government, for which my father worked, moved to Taiwan. Although my father was an apolitical engineer, his fate and his family’s well-being were tied to the Nationalist Government. Therefore, we moved to Taiwan, too. The Communists could not take over Taiwan, because they didn’t have a navy to land their troops on the island and Taiwan was under American protection. Taiwan is still under *de facto* American protection 66 years later now. My father first flew to Taiwan to set up for the family. My mother, my brother Shuan-Hui (煊輝), my sister Jim-Wen (錦文) and I followed my father to Taiwan. Why did my parents only take 3 of the 5 siblings and leave 2 sisters behind? By 1949, my eldest sister, Jin-Xien (錦賢) had already graduated from college. She was teaching in a middle school and had a lover who was an underground Communist. It was understandable that she did not want to leave. She also volunteered to take care of another sister Jin-Rui (錦瑞) and our grandmother. My parents did not realize that the decision would split the family apart for more than 4 decades. My mother often thought of the two sisters left in the mainland. She told me how my eldest sister Jin-Xien led mother

and three younger siblings trekked several hundred miles from Shanghai to Fujian to escape the brutal Japanese Army. She told me how excellent sister Jin-Rui was doing in school. While other students had to pay tuition to go to the school, Jin-Rui earned scholarships, not only tuition free but money to help the family. These two sisters had suffered a lot of hardships, just because their parents went to Taiwan. Jin-Rui especially had endured many years of ill health. To not burden others in our family, she joined the People Liberation Army. In the Army with her determination, hard-working and intelligence she learned and became a meteorology specialist. Eventually, she advanced to be a professor in college. Jin-Xien remained in the home town, took care of our grandmother and raise four children by herself. I really admired their endurances and achievements in face of the hardships. I wished we someday our family could have a grand reunion. Not until late 1980's, our siblings were able to meet again. By then my mother had already passed away. It was a tragic split-up of my family. But it is not more tragic than millions of Chinese families torn apart or destroyed in World War II and the ensuing Chinese civil war.

Both sister Jin-Wen (15 years elder) and brother Shuan-Hui (12 years elder) helped and guided me a lot when I was in Taiwan, from elementary school to college years. Jin-Wen stood in for my parents in all my elementary school functions. She provided lunches for me when I was in junior and high school, because her house was close to the school. I stayed in her home for one year after I went to college in Taipei. She had moved to a house which happened to be close to the university. Her husband, Tho Thong-Cheng (左棟臣) was a straightforward gentleman from the China Northeast. He treated me like his younger brother. He liked to make dumplings. I had eaten countless of delicious dumplings made by him. I was close to each of them for most of my life, from Taichung, to Taipei, then to Houston. Whenever I think of them, my heart is filled with immense gratitude for their brotherly helps. Their children, Julie, Grace and Michael moved to the Houston area in the 1980's. They are all successful in their business. After their retirements sister Jin-Wen and brother-in-law also immigrated to the United States to live near their children. Sister Jin-Wen was my closest sibling until she passed away in Houston, 2013.

Shuan-Hui whom I call "Big Brother (大哥)" is a tall gentleman. When I was young, he was the discipliner, carrying out my parents' job. All my mischiefs stopped by just a roar from him. He not only kept me straight but also looked after me. He wrote letters to encourage me when I was preparing for my College Entrance Examination. When Jen-Ching visited my parents for the first time, they wanted to give her a gift appropriate for the occasion. It was Shuan-Hui who brought a red wool-coat from Taipei for my parents to give to Jen-Ching. His wife Chang Yun-Hsien (張韻賢) also treated me like her own kid brother. When I was in college, I often visited them who live just 30 minutes away. She taught me how to live in a cosmopolitan, Taipei. She introduced me to many delicious foods that I had never tasted before. Missing those treats would have been a

major regret of my life.

Having to fled from the Communists was traumatic but a good fortune for my live. For if we had stayed, our family would have been subject to discriminations and suppressions. I would not be allowed to go to college. Of course, I wouldn't have come to USA. Most importantly, I would not have met Jen-Ching.

My Elementary School Years

“The first five years have much to do with how the 80 turn out.” - Bill Gates (1955 - AD), American business magnate, Philanthropist, Investor, and Computer programmer

In 1949 my family settled down in the city of Taichung (台中), which literally means the central part of Taiwan. Taichung was a beautiful mid-size city with a population of about 200,000. Many “Phoenix” trees (鳳凰樹, called Flamboyant Trees in America) line city streets. When the trees bloomed, they looked like a sea of flames. In Taichung, we lived in a house owned by my father's employer, the Telephone and Telegraph Bureau. My father was the Chief Engineer of its local branch. Therefore, the house assigned to him was relatively nice. It was a Japanese style duplex with walled-in front and back yards. The house had 2 bed rooms with elevated tatami mats (Japanese style floor which could be used as beds), a living room, bathroom, toilet and kitchen. A lychee and several guava fruit trees were in the yards. When the trees bore fruits, I was the most enviable and welcome kid in the block. My parents lived in the house even after my father retired. In the 1980's, the Telephone and Telegraph Bureau recouped and sold the land to a developer. The house was leveled and a seven-story condominium was built on the land. The condo has 42 units but no yard.

Not long after we settled down, my parents wanted me to go to school. The school, Ta-tung Elementary (大同國小), was just two blocks away from our house. But I was unwilling and resistant against the idea of schooling. What's wrong with just eating, sleeping and playing? I was perfectly happy with catching dragon flies, rolling marbles or flushing giant crickets out their ground holes. Not until after a few spanks on my buttock by my elder brother, did I become a reluctant student. According to my age and my reading ability, I was assigned to the 2nd grade, skipping the first and half years. This caused a serious problem for me. In the class, students learned to read in Chinese Mandarin. To do that, the students had to utilize Chinese Phonetic Symbols (注音符號, Chinese counterpart to Webb Pronunciation Symbols). They learned the Symbols in the 1st grade. Everybody except me in the 2nd grade class had learned that already. So, what could I do to catch up? The teacher didn't care to tutor me individually. I was totally lost until my elder sister, Jin-Wen, took the matter into her own hands. She learned the Phonetic Symbols herself first. As a college student, she really didn't have to learn the Symbols. She did it and then tutored me. That's was one of hundred things I was in debt to her.

Though I started my school later than all my classmates did, I was able to catch up and soon rose to the top. The school was on the outer edge of the city Taichung bordering a rural area. Many of my classmates were from farming families. They often went to the school in bare feet because shoes were too expensive. They had to help in the rice paddies of their family. Often, they could not catch up in the classes. Corporal punishments were a common practice of the teachers. Most of those poor students were on the receiving end of it. There were occasions when all students in the class were whipped by teacher's bamboo stick. There was no exception even for me, a well-behaved student with top grades. The oriental (Chinese, Korean and Japanese) tradition of punishing the whole group instead of responsible individuals was prevalent in those years.

After school, I played with the kids next doors. We had just few toys. A handful of glass marbles and hardboard cards with printed pictures of heroes in Chinese novels are all we had. We played marbles like hitting mini golf with our fingers as putts. We showed one another the hardboard cards to see who got the most well-known ferocious-looking heroes. We were contented with those toys. The holiday most welcome by us kids was the Lunar New Year. We had more meats on our dinner table for the holidays. But the meats came from a chicken we raised in our yard. We traded other chickens to friends and merchants. I didn't feel sorry for the chickens, they were expected to be consumed since the eggs hatched. On the New Year's Day, kids got red envelopes from their parents with money in it. I usually got NT\$20 that was equivalent to \$0.50 US\$ every year. That was an envy of my friends.

A moment that happened in my 3rd grade is still vivid in my memory. Since I was the top student, the teacher assigned me to participate in the speech contest held by the school. I had no problem in preparing a draft, in a 3rd grader way, for my speech. After the teacher revised the draft, I have it memorized. We stayed in the school after the class to rehearse the speech a few times. Everything seemed in order until my sister showed up to check out why I was late going home. When I saw my sister, I bawled hysterically like a baby. It was like I was grasping my last straw to avoid drowning. I just refused to participate in the speech contest. Neither my sister nor my teacher could change my mind. I knew that I truly let my teacher and sister down. Speaking in public had always been a challenge for me, due to my shyness. Since that embarrassing 3rd grade moment, I had tried very hard to overcome the challenge. By my high school years, I was able to speak publicly in front of the 3,000 fellow students, although I could also feel my legs shaking.

My elementary school was coeducational. There were girls in my class. I was indifferent to those girls. Not until a reunion 10 years later, I found out that a girl really like me in the 6th grade. I was too dumb to have any feeling then. That was not a problem, since we were on different paths after the elementary school to all-girls and all-boys middle schools. The "Sorrows of Young Werther" flew pass us just like clouds in wind. In the

6th grade, all my attention was in preparation of taking the entrance examination for middle school. The entrance competition was very keen. Some of my classmates paid extra money to take private lessons in teacher's home. I never did. However, I was the only one of my class to enter the best middle/high school in town, the Taichung First High School (台中一中). It was an all-boys school for 7th thru 12th grades.

Entrance examinations have been a sacred tradition of China. Different levels of examinations have been used to select students from elementary to high schools, to colleges, and to graduate schools, and so on. Civil service examinations have been used to select government officials at the entry level since the Tang dynasty in the 7th century. Teachers or government officials who prepared test questions were sequestered before the tests. The test papers only showed a number, in lieu of student's name which was sealed. Violations of sequestration, leaks of test questions or cheating were punished severely. In imperial China, many officials lost their life due to corruptions of the test rules.

The junior high school entrance examination was the first critical examination that I took. From then on, I have been able to do well in many more critical examinations. I attribute my successes to my capability of memorizing things in study and work. There was one incident happened in the junior high entrance examination that imprinted on my young mind with the dark shadows of bribing and cheating. On the day before the examination, a worker who cooked for the sequestered teachers smuggled out a copy of test questions and sold the copy to some families and teachers of the students to be tested. My teacher, although didn't participate in the leak, somehow learned that the topic of the essay test was "Clock". He came to our house in the morning of the test day to inform me about the topic just minutes before I was ready to leave for the test. The test went on and topic was exactly as the teacher told me. However, before the test results were published, the scandal was exposed. The cook was jailed and the principal of the high school was demoted even though he wasn't involved. The results of the test were invalidated. All of us had to take a second test with new questions. The leak probably wouldn't have affected me anyway. I would have finished in the top and being admitted to the high school even competing against those who bought their advantages. My loss in this incident was my innocent belief that the world would be fair all the time.

My Junior High School Years

"When I was young and vigorous, I was happy naturally, without the need of being cheered up. I wanted to flap my wings and flew leisurely over the whole world." "思我少壯時，無樂自欣豫。猛志逸四海，騫翮思遠翥" - Tao Yuanming 陶淵明 (365 - 427 AD), Poet

I didn't have a great aspiration like Tao Yuanming's, but I was happy and carefree during those young years. Taiwan was a beautiful subtropical island. Colorful flowers and lustrous foliage covered plains, valleys and mountains. Wild orchids and butterflies were

abundant. Climate was mild throughout the year, with no freezing in most of the island, except on high mountains. We did not have any heating indoor other than a coal-burning stove for cooking. Wearing cotton-filled coats was enough to keep us warm. Long hot summer days were moderated by rain showers. We didn't have air conditioning in our houses. Only in my late teen years, air conditioning was first installed in few movie theaters and department stores in major cities. Sometimes I bought a ticket to enjoy the movie as well as the air conditioning. Most of the houses in Taiwan before 1990's utilized an electric fan for summer cooling. Occasionally in summer or autumn, typhoons brought floods and wind damages. They blew over in a day or two. More unpredictable and horrible were earthquakes which lasted only few minutes but could cause more damages. The resilient people of Taiwan just picked up the pieces and rebuilt. Overall, living in Taiwan was easier and enjoyable than that in most other regions of China.

Politically or socially, Taiwan was relatively stable, comparing to tumultuous chaos in China under Communists. The horrible tragedies that took place in mainland China during its "Cultural Revolution" were beyond my comprehension. We had enough foods in Taiwan in contrast to starvations and deaths in China under its "People's Communes" policy. Yes, there were deficiencies in freedom of press or in freedom of speech in Taiwan. Most of us knew what not to write or not to speak publicly. Even an adolescent like me knew. Wisdoms of 4-thousand years had kept most people sensitive to politic taboos. The major crime rate was low and people were kind-hearted. Most importantly, Chinese Communists could not invade Taiwan for a long, long time. We escaped the horrors brought on Chinese in the mainland by Mao Zedong (毛澤東) and his Communist followers. Under Mao' rule, more Chinese had been killed or starved to death than the 20 million Chinese casualties during the WWII.

I was doing well in school. I was one of top students in my class, but never a pretentious one. I got along with all my classmates. I willingly shared my homework with them. If they wanted to plagiarize, that was alright with me. Teachers knew the differences after examinations. I learned that sharing made friends. It might be too much sharing, I found myself democratically elected as the "President" of my class. In Taiwan, schools maintained the oriental (Chinese and Japanese) traditions of requiring students to clean up classrooms and schoolyards. One of the responsibilities of the class President was to assign cleaning jobs to his classmates. I often gave myself the hardest job and was the last one to go home. Decades later, when I became a manager in NASA, I realized that was good leadership by rolling up your own sleeves to set example. I also developed a habit of completing my homework a day or two before its due day, no procrastination. These habits, which might be insignificant at the time, helped me a lot in my career.

In the junior high years, I found out that I liked mathematics and sciences. The logics in mathematics and sciences are so natural to me. I excelled in those classes without putting in much efforts. I never thanked my father in words for the genes he passed to me. But I knew that he was pleased to see me taking up engineering and sciences after him.

The junior high years were also when I learned classical Chinese poetry and prose. I appreciated them more than modern Chinese writings. I would romanticize living in the eras of those literatures so began to read classical novels, such as “Romance of the Three Kingdoms (三國演義)”, “Journey to the West (西游記)”, and “Outlaws of the Marsh (水滸傳)”, three of the four great Chinese novels written in 14th to 16th century. I didn’t read the fourth great classic Chinese novel, “Dreams in the Red Chamber (紅樓夢)”, until my senior high years. The contents of the “Dreams in the Red Chamber” could not be appreciated by early teens. I read many more Chinese novels in addition to the great four. Frankly, none other than the great four left indelible impression in my mind.

My mother also read those books when I rent them from the bookstore. Apparently, she liked the plots, characters and writing styles in those books. I might have inherited literature genes from her side, because I had never seen my father reading those “useless” books. I spent a lot of my after-school hours in reading novels, because there was not much else to do. We didn’t have a TV or TV broadcasting until my college years. Besides reading I enjoyed watching movies in theaters. I liked movies from the western world, mostly from Hollywood. “Gone with the Wind”, “Snow White”, “The Wizard of Oz”, “High Noon”, “Shane”, “Ivanhoe”, and “Old Yeller” were a few favorites still in my memory. I also liked “Bicycle Thieves” from Italy.

The first year in the junior high school, we began to learn the alphabets and simple English words such as book, home, cat, dog, etc. English is a language so different from Chinese. I seemed to have to use another part of my brain to learn it. My first English teacher was taught by Japanese teachers. We pronounced cat like “carto”, book like “buku”. After that first year, it took years for me to purge those Japanese accents out of my English. I did well in English examinations, for they were in writing only. Two years later, I did have an excellent English teacher. My interest as well as pronunciations improved. Not long after teaching our class, she left and went to study in America. Eventually, she was hired as an English professor in National Taiwan University. She is a famous literary critic and author in Taiwan. Her name is Dr. Chi Bang-Yuan (齊邦媛).

Was there anything I was not good in junior high? Yes, I was mediocre in music, arts and craftsmanship, generally getting B- or C’s. I was a D- or F student in physical education. The physical education of my high school years included only track, field and gymnastic exercises, no team sport. I was slow in dashing or running. I could jump neither high nor far enough. As for pushups and chin-ups, my best couldn’t pass the minimal requirements. I don’t think that the problem was due to lack of efforts. Rather, it was due to the shape of my body - short limbs and large head. These deficiencies plagued me until my sophomore year in college. Finally, there was no more PE and embarrassments, what a relief!

In the junior high school, all students had to join the Boy Scout. In the 8th grade, our scout troops went camping and had to cook for ourselves for the first time in our life. The scout master taught us to dig a hole in the ground and to set up camp fire. He then left us alone to do the rest. That was my first and last half-cooked meal. After the “meal”, we pitched a tent and went to sleep quickly. We woke up the next morning and found that our tent was right next to a child’s grave! The eerie feeling lingered in my mind for a long time. We dared not to ask the scout master if he intentionally picked the camping site.

Three years of junior high flew by. It was time to prepare for senior high school entrance examinations. Ordinarily, the top graduates of junior high could be exempted from the examinations and promoted directly to the senior high school. These top graduates also had to have unblemished behavior reports and B average in PE. Apparently, I failed to qualify for the exemption by the last criterion. I had to take and pass the entrance examinations.

My Senior High School Years

“When I was too young to know the taste of sadness, I pretended to be sad for composing new poems. Now that I have experienced the taste of sadness thoroughly, I can only say that it is so cold in late autumn.”, “年少不識愁滋味，為賦新詞強說愁。如今識盡愁滋味，只道深涼好個秋。” - Xin Viji 辛棄疾 (1140 - 1207 AD), Poet and Military Leader

My senior high school shared the same campus and principal with my junior high school. They did have different faculty members. The teacher had higher expectations for the students, and vice versa. Through the selection by entrance examinations, many students were from other towns or even other counties outside of Taichung. The school had no local lodging. They had to take daily bus or train trips of up to 1.5 hours each way to attend the best boys high school in the region. Many students were from low income families. However, their parents were willing to bear the additional transportation cost just for their children to attend a better school. I was lucky; the school was just 1.5 mile away within walking distance. As a senior engineer, my father earned relatively high income. My mother cooked breakfast for me every day. I had lunch money to eat well. I never wore out the school uniforms or the bottoms of my shoes. Comparing to some of my classmates, I really didn’t know the taste of sadness.

I continued to do well in academic studies and to get along with my classmates. I was again elected as the class President. In senior high school, we were no longer in Boy Scouts. All students had to receive military training. It was like ROTC in the United States, except it was mandatory for every boy student. As the class “President (班長)” my additional responsibilities were leading the marches of students like soldiers, up and down the track field of the school. Each of us had to carry a rifle (no bullet, of course) on our shoulder. We did the training for the preparation of fighting against the Communists,

if they ever invaded Taiwan. They never did. We did get a few bullets to shoot in a rifle range for a few times. Shooting rifle was exciting to us, but I missed the target badly. The recoil force made my shoulder sore for a few days every time. I was not born to be a soldier. The military training in the high school were taught by 4 or 5 active-duty army officers. They ranked from captain to colonel. They oversaw not only the military training but also disciplining students. Some of them behaved like a drill sergeant and treated us like students in a military school.

During those senior high school years, I began to feel the changes inside my body. I liked girls and wanted to befriend them. We probably all did at those ages. But the norm of the society was still against boy-girl dating before college. The all-boys high schools and all-girls high schools in town coordinated their dismissal times 30 minutes apart, just to avoid accidental mixing of boys and girls in streets. The schools made students, boys and girls, to dress themselves in ways that appeared unattractive to the opposite gender. Boys had to cut our hair short like new army recruits in boot camp. Girls had to keep their hairs short and straight. They were not allowed to put on cosmetics or to wear jewelry. Even in colleges, dating which Chinese called “talking love (談戀愛)”, still required approval of parents on both sides. One of my high school classmates was bold enough to break the norm. In a romantic night, he was “talking love” with a girl in a class room of my old elementary school. The school was closed and the room was dark. Suddenly, a flash light burst into the room followed by the girl’s father. My friend had to run for his life. He was chased into a dead-end ally. The only way out was to climb over a tall wall. He didn’t know that on the other side of the wall was the backyard garden of the Governor of Taiwan (省主席). Governor’s dogs and personal guards rushed into the backyard when they heard the ruckus. He was detained by police for a couple days until they cleared him of suspected attempt to assassinate the Governor. The arrest was published in the local newspaper with his name, but not the girl’s. He was a laughingstock and as well as a folk hero for us, timid boys. About the same time, some of us were infatuated by a new teacher in our school. She was pretty and vivacious. Though she seemed to be friendly, none of us could muster the courage to talk to her. Why would an all-boy high school hire such a beautiful young lady teacher?

I continued my hobby of reading poems and novels after school work. I read and memorized many classical Chinese poems and prose. My favorite poems were “The Ode on the Red Cliffs, Verses I and II (前、後赤壁賦)” by Sue Tungpo (蘇東坡 1037-1101 AD), and “Bring in the Wine (將進酒)” by Li Bai (李白, 701- 762 AD). I loved the joyfulness of enchanted living described by Sue Tungpo. He penned the poem during his first exile from the imperial court. I admired the spontaneity in Li Bai’s drinking song and wished that I could be bold and uninhibited like him. I read many more non-poetry, nonfictional books about Chinese history. Most of them were vernacular Chinese (白話文) versions of “24 Series of Histories (廿四史)” starting with the “Records of The Grand Historian (史記)” and ending with the “History of Ming Dynasty (明史)”. My interest in histories

of the world continues today. On the Chinese novels, I finally read the fourth great classic Chinese novel, “Dreams in the Red Chamber (紅樓夢)” but only understood it partially. I also read some western novels like “The Count of Monte Cristo” and “Gone with the Wind” in Chinese translations.

The Chinese Literature teacher in my second year of high school left indelible impressions on my mind. Besides just teaching the contents of the textbooks, he liked to talk about Chinese philosophies and philosophers. When he recited classical poems, and prosed with his vociferous voice, I felt like going back to those romantic eras. He liked my writings as a student. I was nominated by him to represent our high school in the Student Writing Contest that year. Out of over one hundred contestants from all high schools in Taiwan, I won the second-place prize. I didn’t know the first-place winner personally at the time. We met and competed again in our freshman Chinese Literature class in Taiwan University 2 years later. It was a small world. When the second-high school year was ending, we had to choose what area we would major in college. There were three areas of choices, Literatures, Sciences/Engineering, or Bio-Sciences/Agriculture. When I told my Chinese Literature Teacher that I was going into Engineering, he was disappointed. Of course, that decision affected the rest of my life. My life would be completely different, had I followed his advice to major in Literatures. The teacher, Mr. Wei Zheng-Tung (韋政通) was a self-taught scholar, philosopher and thinker. He later taught in major Chinese universities, Tsing Hua University (北京清華大學, 台灣清華大學) in Beijing and Taiwan.

I had many outstanding teachers in the high school. I am in debt to them for the solid foundation built for my college study. We also had an incompetent one. That happened in the final high school year. Our new Physics class teacher took a couple weeks to just explain Newton’s First Law. Every one of the students couldn’t understand what he was teaching. He was either not a good communicator or never has learned Physics himself. We were all worried about what we were going to do in the coming college entrance examination. A poor score in Physics could have detrimental against us from admission to a good college. I drafted a petition to the Principal of the high school, asking him to appoint a new teacher. The petition was written on a long scroll by my classmate, Peter Chen who was an excellent Chinese calligrapher. After every student in the class signed on the petition I delivered the petition to the Principal. We didn’t get any response. The petition was just disregarded. We were frustrated and desperate. We held a meeting after class and decided to go on “strike”. All students except me skipped the next Physics class, disappeared from the class room. As the class president, I stayed in to explain the situation to the teacher. When the teacher came into the classroom and found only one student in attendance, he left immediately. Not long after that I was called into the Principal’s office. I was warned of the seriousness of our organized disobedience. If continued, we would be dealt with by the police, instead by the school administration. I was ordered to call my classmates back to the class room. The Principal came and warned us

not to continue the strike and jeopardize our future. Fortunately, the issue was resolved quickly. The physics teacher subsequently resigned. A new teacher just graduated from college was assigned to our class. He turned out to be an outstanding teacher. We won! I was very proud of the way we dealt with the situation. We had learned that civil disobedience could affect changes. However, we were very close to stepping over the Government red line against organized student movements.

Another incident in the high school years also molded my characters. Before the first class every day, all students of the school were supposed to gather in the track field. We sang the school song and raised the national flag. As the class president, I had to make a roll-call and report the names of absentees to the school staff. With three unexcused absences, a student would get a written reprimand. Too many reprimands would add up to expulsion from the school. I made the daily roll-calls earnestly. Nobody gave me any problem until my junior year when we had a transferred student. His last name was Kong (孔). Although, nobody told us, we soon learned that he was recognized by the Government as a 78th-generation descendant of Confucius.

Confucius was a great philosopher and teacher of the 6th century BC. His teachings and thoughts, written down by his disciples had been the mainstream guidelines for Chinese politics and educations for more than 2200 years from the Han dynasty until the Communist regime. The philosophy of Confucius emphasized personal and governmental morality, correctness of social relationships, justice and sincerity. Imperial rulers wanted the people to follow Confucius' teachings so they wouldn't rebel against authorities. His male descendants held an inheritable governmental position equivalent to a minister, generations after generations, even after the Republic of China was established. My new classmate Kong was born into this privileged family. He was expected to assume his father's inheritable position someday.

Classmate Kong didn't like to go to school on time or regularly. On the other side, I didn't care whether your last name was Kong or King. If anyone absented in the roll-call, he would be reported. Kong got reported a few times and he didn't like the troubles he was in. One day after class, he told me that he wanted to "negotiate" with me. As usual, I was the last one to leave the classroom. We were one-to-one facing each other in the room. Before he spoke, he pulled a knife out of his pocket and thrust it into the top of my desk. I just froze. Then he said something like "don't report my absence or" I shrugged and that ended the negotiation. Next day he absented in the roll-call again and he was reported again. The situation seemed to be at a stalemate. Not long after that incident, he was transferred to another school. It was a relief that the stand-off ended non-violently.

In the third year of high school, I knew that my college entrance examination scores would open the door of any college or any department that I chose. I could have chosen a

medical (pre-med) school which was and is still the hottest field for students in Taiwan. But an incident that happened in the week before my senior year erased any thought of medical career from my mind. In that week, I volunteered to support the orientation program for freshmen entering the high school. One morning, when all freshmen and teachers were in class, I stayed alone in the office manning the information desk just in case that any new student lost his way. Surprisingly, a student rushed into the office. His face pale, his voice trembling, he shouted "Somebody is lying on the floor and bleeding in a classroom". Without any second thought, I followed him running to the classroom. There, I saw one of my classmates on the floor with blood coming out of his nose and mouth. I raised my voice calling his name. I shook one of his legs. There was no response at all. I felt nausea and dizzy. I didn't remember how we alerted the teachers. Anyway, a doctor arrived later, but it was too late to save him. The doctor and police determined that the classmate died of a nature cause, not of a foul play. I told myself that I didn't want to see a scene like that for a long, long time. A medical career was not for me.

I wanted to be an engineer like my father. But what branch of engineering would I like to be in? In the National Taiwan University, my first choice of college, there were four branches of engineering, chemical, civil, mechanical and electrical. I had my mind set on chemical engineering for 2 reasons. First, I was fascinated by chemistry. In my high school chemistry class, the teacher demonstrated some chemical reactions like magic. Second, there were quite a few women entering the Chemical Engineering Department every year. I wishfully thought I might meet my dream girl there. Both reasons might be adolescent now that I look back at them. However, that was first critical decision made totally by myself alone. It had resulted in a good career.

The college examinations took place about one month after our high school graduation. Lacking the grandeur of a graduation ceremony in the United States, mine was simple and short. There was no handout of diploma individually. None in my family but I attended the ceremony. We just gathered in the hall, the principal and a few teachers gave their farewell messages. That was it; none of the graduates was invited to speak. Our minds were on the college entrance examinations coming up one month later. During the month between the graduation and examination, I spent every day in the Taichung Public Library in preparation for the exam. I made a good plan on how to divide the time for reviewing each of the 6 exam subjects. My elder brother who lives in another city wrote me to encourage me and asked how the preparation went. I told him my plan and assured him I would be admitted to my first college choice, National Taiwan University (國立台灣大學, abbreviated as Taida like UT or A&M). The University was and still is the best and the largest university in Taiwan. I didn't disappoint my brother. I did well in the examination and was admitted into the Chemical Engineering Department, National Taiwan University, with the highest test cores of the students admitted by the department in 1960.

My College Years

“The value of a college education is not the learning of many facts, but the training of the mind to think.” - Albert Einstein (1879 - 1955 AD), Theoretical physicist

I left my adopted hometown in 1960 to go to the National Taiwan University in Taipei (台北) - capital of Taiwan. It was the biggest city I had ever been up to that time. It took more than 5 hours for a train ride to go to Taipei. Fortunately for me, my elder sister and brother were already in Taipei. They made me feel that Taipei was not a totally strange place. After a few days, I learned to get around the university and its neighborhood. I also learned to take the metro bus to visit my sister and brother.

The campus of the University was much larger than that of my high school. Leading from the front gate into the University, a long and wide boulevard lined with palm trees and azalea shrubs welcome students, faculties, and visitors to the campus. In March and April every year, azalea blossoms in the campus are one of the most beautiful scenes in Taipei. Behind and the palm trees and azalea shrubs, scores of buildings provided classrooms for more than 20,000 students. That was such a beautiful and exciting environment for me. Freshmen students of all departments took general classes in two or three buildings. Finally, I had met my peers in competitions. Getting top scores in the classes required substantial efforts. I met and made some new friends, mostly boys. There were about 10 girls in my 70-some chemical engineering class, a relatively large group in the fields of engineering. I was wrong in that I expected any of them to be my dream girl. Anyway, I was too shy and immature, in the entire 4 college years, to ask any of those lady classmates to move a step beyond friendship with me.

Due to lack of textbooks for sciences and engineering in Chinese, we had to use English textbooks authored by professors in American or British universities. None of us could afford to buy an authorized copy of the textbooks. It would have taken our living expenses of 2 months to buy a single authorized book. So, we all had to use “pirated copies”. I could read and understand most of the contents in the English textbooks with the help of a dictionary. However, my capabilities of conversation and writing in English were poor. My English fluency stayed at that level for the college years. I didn’t catch on the need to improve them until coming to the United States. The sizes of our classes were large. Teachings by professors were still primary on interpretations of the textbooks. We gained good knowledge in engineering, but free thinking or creativities were seldom. Training of the mind to think just wasn’t a strong traditional value of Chinese education.

My freshman year started with me moving into a dormitory. The dorm for freshmen was quite a distance away from the campus, practically in the middle of nothing. To go to school or to buy meals, I had to walk for 30 to 40 minutes. Other students in the dorm rode bicycles. I couldn’t, because I hadn’t learned how to ride bicycles. I didn’t learn it because I could walk to anywhere I wanted to go in my hometown. Besides, my mother

was overprotective in not encouraging me to ride bicycles. I didn't realize that was a major handicap until I moved in the University dorm. My "spoiled little brother" solution of the handicap was asking my elder sister if I could stay in their home until the next year when a closer dorm would be available. I was so relieved when she granted my request. That was a huge favor, for her house really did not have room for an extra person. In my sophomore year, I did move into a closer dorm.

Though I had to study harder in college, I still found time to read some Chinese "martial-arts and errant knights" novels. The Chinese character "俠 (errant knight)" means a person who used his skills and powers to fight against sufferings and injustices outside of the laws. They were heroes in folklores. In my sophomore year, I got hold of one of "martial arts and errant knights" novels written by Jin Yong (金庸), pen name of Louis Cha Leung-yung (查良鏞, 1921- AD). His books were banned by the Nationalist Government in Taiwan at that time, because they were first published in a pro-Communists newspaper in Hong Kong. Only "bootleg" copies were circulated under the disguise of a falsified author and title. Jin Yong's novels were head and shoulders above the ordinary ones I read before. He incorporated Chinese martial arts, history, heroism as well as western chivalry and Greek tragedies into plots and characters that are highly attractive to educated Chinese readers. He published 15 pieces of Chinese "martial-arts and errant knights" fictions. Movies and TV series had been made for all of them. He is currently the bestselling Chinese writer alive. I read all his "martial-arts and errant knights" books. Some of them I read after I came to the United States, because they were not accessible to me in Taiwan. After I began to read Jin Yong's novel, I never wanted to read "martial-arts and errant knights" novels by another author.

Moving into the dorm meant that I had to take care of myself living outside of my family. Each room in the dorm had 4 bunker beds for 8 students. The remaining space in the room allowed each of the eight students to have a small desk and a small storage area for clothes. The space was crammed but the eight roommates got along quite well. Of course, the dorm had no heating or AC. The whole dorm of 400+ students had one kitchen which served low quality foods, comparing to my mom's and sister's cooking. I ate out a lot. The dorm experience toughened me up a lot. I needed that to survive the army boot camp to which every male college student in Taiwan had to go. The overseas Chinese students from Hong Kong and Southeast Asian countries such as the Philippines, Vietnam, Malaysia, Indonesia and Thailand were exempted from military service. These overseas students took up more than one third of the capacities in the top universities in Taiwan. The policy to admit these students drew some complaints. The unfairness to the people in Taiwan was apparent, because only less half of high school graduates in Taiwan were admitted into colleges, less than 5% to the top-rated universities. The Nationalist government set aside the precious educational resources in the top colleges for those overseas Chinese students to gain support of their families over from the Chinese Communists. The policy was quite successful as the good will of the people and government of Taiwan were appreciated by the overseas Chinese communities.

The Nationalist government led by Generalissimo Chiang Kai-shek needed support from not only the United States but also other “free world” countries to fend off the Communists. Oversea Chinese had substantial influences on the politics of these “free world” countries. Internally the government was authoritative, with restrictions on freedom of speech and press. Pro-communist and pro-Taiwan Independence activities were severely suppressed. The latter was caused by differences in cultures and self-identities between Taiwanese and Mainlanders. The Mainlanders were people who moved to Taiwan in 1946-1950. At the time, the government power was concentrated in the hands of the elite Mainlanders. Although, Ban-Lam-Gu (Minan dialect 閩南話) and Hakka (客家話) were mother tongues for 85% of the population, the official Mandarin was imposed in education and administration systems. These policies and the uneven power sharing led to serious resentments, especially from the upper class, rich Taiwanese. The middle and low classes of both groups lived side-by-side and got along better. Generalissimo’s successor, his eldest son Chiang Ching-Kuo (蔣經國) gradually appointed more Taiwanese officers into the government. Chiang Ching-Kuo and his cabinet were the key leaders in the rapid development of economy of Taiwan in 1970’s. They deserved credits for leading Taiwan into an industrialized country. The military at 1950 and 60’s was mainly composed of Mainlanders. Those officers and soldiers deserved credits for protecting Taiwan from a Communist invasion. The differences and resentments were slowly but surely dissipated by inter-marriages and common educations. Mainlanders, including their second, third and fourth descendants born in Taiwan are in minority now. Losing power and statue in each election cycle like the one held recently in 2015 were expected. But discrimination shouldn’t be allowed either way.

The summer after the sophomore year, I had to go to the mandatory army boot camp. The training was to prepare us to serve as reserve officers in the Nationalist army. We lived in barracks that housed hundreds of students. There was no individual bed. We slept on huge bunker beds with tens in each of the upper and lower beds. The military drills were harsh. Our uniforms would be wet thoroughly by our sweat after less than 1 hour of drilling under the hot July sun. We didn’t have clean clothes to change every day, so we stunk. The drill sergeants were tyrannical and often verbally abusive. We learned to crawl under barbed wires. We learned how to throw a grenade and how to stab and slash with a bayonet. The boot camp might not have turned the students into good soldiers. But it did make men out of the boys.

After the boot camp, we went back to colleges for our junior year. That was the year when I learned specialized and useful chemical engineering knowledges. We had two very good professors whose teachings benefited me for my whole career. Professors Chang Min-Che (張明哲) was later President of Tsing Hua University in Taiwan. Professor Tseng Jian-Yen (鄭建炎) later taught at the University of New Mexico, in the United States. I hit the books and studied very hard that year. Our laboratory courses

required us to carry out chemical experiments hand-on. Again, I was fascinated by chemical reactions of the experiments. I remembered that sulfuric acid burnt a large hole through my clothes. I saw a test tube exploded in the hand of my lab mate when he mixed two chemicals too fast. The experiences taught me to be very safety-conscious in laboratory. A good friend and I rented and shared a boarding house room near the University. We lived more comfortably than we did in the dorm. Peter Chen (陳遠放) and I have been best friends. We have kept in touch with each other since then. Peter met his future wife, Hatty (張鳳貞) in that year. They fell in love quickly and went “steady”. I wished that I could find my dream girl too. But that had to wait for another two years.

When I paid attention in classes and studied hard, I was always able to get top grades. But I seemed to have lost that attention in my senior year. It was like standing at the crossroad and not sure of which way to go after finishing the college. A few graduate schools were just established in Taiwan. They were unattractive to me. My life plan was straight forward up to that point. Facing the completion of my education, the future was getting a little complicated in my unsophisticated mind. Where could I go to get a job? Should I go to a graduate school thousands of miles away in the United State? Could I meet my dream girl before departing for USA? My mind wondered. I forgot the teaching from one of the oldest Chinese book, Yi Jing (易經), “Be happy with the rules of nature and accept the unpredictability of fate, you won’t be worried about future (樂天知命，故不憂)”. I didn’t get good grades in the last semester of my college years. I learned a lesson - concentrating on the immediate tasks.

After graduating from colleges, all men had to serve as second lieutenants in the army, navy or air force for one year. We drew from lots to determine which branch of the military we would serve. There were big differences between the military branches. For example, to serve as a ground officer at an air force base had much easier and safer time than an officer in infantry or artillery. I drew the artillery and accepted it as my fate. But I learned later that the drawing was rigged. My classmates with family connections were already assigned to easier jobs before the drawing. The easiest assignments were serving in the Military Police units, because they stayed in the big city – Taipei. These assignments were reserved for men from families with high connections. The unfair drawing firmed up my decision to come to the United States for a fairer competition field. Anyway, artillery here I come. After 3 months of training in the Artillery School, I was a second lieutenant forward observer assigned to the 631st Artillery Battalion in the Nationalist Army. The job of forward observer was the most dangerous job in an artillery battalion. He was the eyes of the battalion and positioned miles ahead of the howitzers (cannons). After the howitzers fired, the observer would call the battalion back and tell them where the shells hit. The Battalion would then adjust so that the next volleys could hit the targets closer. From the enemy’s point view, if they could kill the forward observers the howitzers would fire blindly. Artillery battalions of the Nationalist Army were rotated and positioned between Taiwan and two small groups of islands, Kinmen (金門)

and Matsu (馬祖) that were closely off the shores of mainland China. Nationalists and Communists were shelling each other between the mainland and the islands in 1964. Had I been assigned to an Artillery Battalion stationed on those islands, I would have been shelled by the Communists daily. I was lucky that the 631st Artillery Battalion just rotated off Matsu and positioned back to Taiwan. The Battalion stayed in Taiwan for the whole time when I served. I was never in danger.

The Artillery Battalion was mainly composed of two kinds of soldiers. The first group was Mainlander commissioned and non-commissioned officers. Being a college graduate at least 15 years younger than them, I was treated like a kid brother. I looked upon them with respect because they were our protectors from the Communists when I was in school. Sometimes we ate at street vendors and drank mijiu (米酒, alcoholic beverage made from rice) together. I would listen to their laments of separation from their families, parents or wives. I empathized with them, because I had heard my mother's laments of leaving her two daughters in the mainland. With the second group of Taiwanese draftees, I could talk to them in their mother tongues in private occasions. I gave them as much leeway and benefits of doubt within my authority. Unlike other officers, I never scold, cursed or used profanity to abuse them. "Do not do to others what you would not like to be done to you (己所不欲，勿施於人)" said Confucius. "Do to others as you would have them do to you." - Luke 6:31. That is the way I get along with all people in my life.

Meeting and Marrying My Dream Girl

"Like a pair of ospreys calling each other on the sandbars in the river, the fair lady and the gentleman with noble characters will be mates for life", in Chinese "關關雎鳩，在河之州。窈窕淑女，君子好逑。" - from "Classic of Poetry 詩經" by Anonymous Author. The "Classic of Poetry" is one of the oldest Chinese books (prior to the 6th century BC). The quote above was mentioned by Confucius (551-479 BC) in his books. Ospreys were known to mate for life.

Between graduating from the college and joining the Army, the most important occasion in my life took place. I met Grace; her name was CHANG, Jen-Ching (張仁慶) then. She just finished her sophomore year in college and was home for the summer. Jen-Ching and her family lived across the alley from my high school/college classmate, Paul Tien (田仲麟). Jen-Ching's mother asked Paul to introduce an honest and reliable man to her. Paul thought that I fitted the bill. Paul invited her to watch a movie with him and "his friend/classmate". Three of us met in front of a movie theater on July 7, 1964. She was the most beautiful woman I ever met, and she still is. Her eyes bright and charming, her cheeks rosy and appealing, her hairs thick and shining, her smiles sweet and heart-melting, her dress simple but cute, and her manner elegant and friendly, she is my dream girl! Jen-Ching, Paul and I went into the theater to watch the movie. I was so excited that I had no memory of either the title or the contents of the movie.

After the first meeting, I invited Jen-Ching to watch another movie just with me, no third person. We went to see a Chinese opera movie and we had crushed ice after the movie. We had a few more outings together before I had to leave for the military service. Jen-Ching invited me to meet with her family. According to Chinese customs, I was supposed to bring some gifts to her for the occasion. The gifts were two hen-chicks that my mom raised in our yard. She was very pleased and raised them as pets. The hens lay many eggs for her family. The hens eventually ended on the dinner table, as Jen-Ching cried on the side and refused to eat her “pet”.

Jen-Ching’s father, Mr. Chang Sung-Han (張松涵) was the Library Director of the Examination Yuan in the Nationalist government, a high civil service position. When we met, he had retired for a few years after suffering a stroke. He just nodded without saying anything when I bowed and shook his hand. His height and facial profile impressed me that he was a tall and handsome gentleman before his illness. Mr. Chang was from Fuyu (扶餘), Jilin Province (吉林省) in Northeast China. He graduated from Beijing University (北京大學) and served in the government for his whole career. After the victory over Japan, he was appointed Chief of Education of Xin-An Province (興安省教育廳長) in Northeast China, near his hometown. Not long after he assumed the position, Xin-An Province was cut off from the areas controlled by the Nationalist government in the ensuing civil war. Mr. Chang masqueraded as a farmer, used a fictitious name, and walked several hundred miles through Communists-infiltrated areas to reach safety in Beijing. Like my family, Mr. Chang and his family moved to Taiwan following the Nationalist government in 1949.

Jen-Ching’s mother, Mrs. Tai Shu-Jen (戴樹仁) was from Hefei (合肥), Anhui (安徽). Anhui is a province in central China. She was a vanguard of Chinese women after their liberation from the traditional male-centered society. She was one of few women pioneers who graduated from Beijing Normal University (北京師範大學). She taught English in intermediate schools. Mr. and Mrs. Chang followed the Nationalist government moving around when China fought against Japan. They settled in Chong-Ching (重慶 or Chunkin, present pinyin Chongqing), the wartime capital of China in the later part of the war. Near the end of the war, their youngest child and only daughter, Jen-Ching (仁慶) was born. They named their daughter after her mother and the city Chong-Ching. After the Chinese victory over Japan, Mrs. Tai went back to her home province where she established the 1st girls’ high school in the province. She was the first Principal of that high school. Unfortunately, she had to leave the school behind a few years later when the Communists took over mainland China. Mrs. Tai was elected to represent her hometown in the first National Assembly (國民代表大會) that elected the first President of the Republic of China, Chiang Kai-shek under the first Constitution of the Republic. She served in the National Assembly for many more years.

Mrs. Tai was a strong-will lady and a disciplinarian. Due to the illness suffered by Jen-Ching's father, she had to assume the responsibilities of both parents. She was the income-earner, the decision-maker, the care-taker of sick husband for many years, as well as the mother of 4 children. Mrs. Tai would have been called an "Iron Lady" today. In the house of this Iron Lady, girl and boys are treated equally. Influenced by the Westernized education that she received, she supported her children and let them grow on their own ways. On the other side, her children respected her opinions and guidance. All her children (3 elder brothers, Jen-Long, Jen-Yuan, Jen-Nian and Jen-Ching) graduated from colleges under a tight family budget burdened by the medical expenses for caring of Jen-Ching's father. As a traditional Chinese mother, Mrs. Tai wanted her daughter to meet and befriend an honest and reliable fellow from a family of similar backgrounds and up-brings. She believed those qualities were important for a steady and loving family. That's why she liked me when I first visited her family. With her approval and influence, I was fortunate to take the hands of the love of my life. I am in eternal gratitude to my parents and to Jen-Ching's parents for the great life and family that I have enjoyed in the past five decades. Their wisdoms and sacrifices would never fade from my memory.

The training in the Artillery School interrupted me from dating Jen-Ching for a while, because it took a 7-hour train ride to meet her. When I could not see Jen-Ching, I wrote her almost every day. If there was a way to value everything that I ever wrote like investments, I got the highest returns from those love letters. Soon we were in love. I don't know how to describe the feeling of falling in love with Jen-Ching. All I know is that I never want to lose that feeling.

I had a lucky break again. After the Artillery school training, I was assigned to the Battalion that stationed in a base just one and half hours from her. I went to her school dorm to take her out almost every Sunday. I was such a frequent visitor to her dorm that Shi Li-Tong (石麗東), one of her dorm-mates recognized me immediately many years later in Houston as the guy who faithfully reported to their dorm every Sunday. When I got out of the military service, I proposed to Jen-Ching to get married. While Jen-Ching's mother approved our relationship, she insisted that we had to wait until Jen-Ching finished her college. That meant another year of waiting after I finished the military service. I wanted to find a job close to her during that year. Due to my good grades, I was selected as a teaching assistant in my alma mater. It only took us a 30-minute bus ride to see each other.

The year of waiting was worthwhile. Most of my classmates had already left for the United States to pursue graduate study. They were able to take tests and apply for graduate schools when their military services positioned them in the big city, Taipei. I spent the limited spare time in my military service year pursuing my dream girl. That was my highest priority. After completing my military service and securing a job near Jen-Ching, I had enough time to take the tests and applied for graduate school. I scored very high in

the GRE (Graduate Record Examinations) Quantitative and Engineering Tests, 99th and 98th percentiles, respectively. My Verbal Test score was a lowly 3rd percentile, as expected for my English fluency at the time. These test scores were good enough to be admitted into the Department of Chemical Engineering at Rice University, with a full scholarship. That was another dream came true. I had to pass two more tests to get the Government to issue a passport and to obtain a student visa from the United States. I passed both tests in due time.

After the one-year wait for Jen-Ching to finish her college, we were married on July 10, 1966. Kathy Lu (盧亞健), Jen-Ching's friend since high school and roommate in college was the bridesmaid. Pete Chen, my friend since high school and roommate in college was the best man. The wedding was held in the grand hall of a new hotel in our hometown, Taichung. The wedding was modest with about 200 guests attending. Most of the guests were relatives or friends of our parents. We went to Chengcing Lake (澄清湖) area near Kaohsiung (高雄), the second largest city of Taiwan for honeymoon (just a few days). "Chengcing" in Chinese means "Clear". What a coincident it was that we would settle in the Clear Lake area of Houston years later.

Coming to America

*Centre of equal daughters, equal sons,
All, all alike endear'd, grown, ungrown, young or old,
Strong, ample, fair, enduring, capable, rich,
Perennial with the Earth, with Freedom, Law and Love,
A grand, sane, towering, seated Mother,
Chair'd in the adamant of Time.* – "America" by Walter Whitman (1819 – 1892 AD),
American Poet, Essayist and Journalist

The land of opportunities, the land of the free, the land where all men are created equal, my future was to be found in that land. Less than two months after the wedding, I left Taiwan for the United States to go to Rice University. Jen-Ching could not go with me right away because I wanted to make sure that my scholarship could support both of us. Besides, my parents and I could afford to buy a single ticket for the trip. The single one-way ticket cost about US\$ 800. That was equivalent to more than 1 years of my salary at the University. It was hard to leave the beautiful island of Taiwan where I had happy childhood and adolescent years. It was harder to say goodbye to my family, especially my aging parents and my beautiful wife. I still remember the ridiculous and absent-minded incident happened before my long trip to the USA. The day before my flight, my parents, Jen-Ching and I took a 4-hour train-ride from Taichung to Taipei where the airport was located. We arrived at my elder brother's home to stay there overnight. Suddenly I found out that I left my airline ticket at home back in Taichung. Oh! Had I screwed up! The paper ticket was absolutely needed for getting on the plane. There was neither computerized passenger list nor credit card in 1966. Thanks to my newly-wedded, calm and considerate wife for she volunteered to go back to Taichung to retrieve the

ticket for me. It was a round trip of more than 10 hours of train and taxi rides. The blunder and its resolution were indicative of the team work we have for the following fifty years. I tend to think ahead most of the time, but sometimes I could be absent-minded of the current tasks. Jen-Ching always focuses on the current tasks and often reminds me of what I've overlooked. That was not the last time that I forgot to bring airline ticket to go on a trip. I could only rationalize the absent-minds on my anxiety of leaving my family.

The airline I flew was called the Flying Tigers Airline. It was funded by General Claire Chennault (1893-1958). General Chennault was an American military aviator best known for leading American aviation volunteers fighting against Japanese in China before the Pearl Harbor attack. After the Pearl Harbor, he was appointed by the Allies as Commander of the Air Forces in the Chinese Theater. He was a popular hero among the Nationalist Chinese in Taiwan. In 1966, by President Lyndon Johnson's order, more American troops were sent to fight in Vietnam. The Flying Tiger Airlines was chartered by the American government to ferry troops to Vietnam. The chartered planes could not pick up regular passenger, because the Flying Tigers were not a regular civil airline. The Flying Tigers utilized Chennault's connection to the Nationalist government to gain permission for a stop-over in Taipei and picked up students coming to America. That seemed to be a win-win for both the Flying Tigers and the students. The students got a cheaper than regular fare and the airline made more money. There was only one problem, the planes were old and slow as they were propeller not jet powered. The plane that I flew in had an engine problem and had to land on Tokyo unexpectedly. We had to wait for 3 days for parts for the engine repair. The airline paid for all our rooms and boards to stay in a decent hotel near the Tokyo Airport. They even paid for our trips to tour the city of Tokyo. After 3 days, we took off from Tokyo for San Francisco. But another engine problem happened and the plane had to land in Anchorage, Alaska. Again, we had to wait for two days in Anchorage. We got free rooms, boards and trips into the city. Finally, we arrived at San Francisco after a 6-day, two-stop flight. I caught a regular airline flight to Houston 7 days after I left Taipei. It was a long trip for me, but I should not complain about the free tours of Tokyo and Anchorage. I doubted that the Flying Tigers made any money out of that flight. But in those good old days, even a low fare, chartered airline upheld decent treatments of their passengers. Neither Jen-Ching nor my family knew of our air plane problems or delays. I couldn't call them, because none of us had a phone on either end.

Arriving in the Houston Airport (now named Hobby Airport) on Sept. 6, 1966 was not the end of my saga. No one was at the airport to pick me up. The friend supposed to pick me up was not informed of my delayed arrival time. While I was wondering what to do next, a Chinese speaking couple arrived at the same flight offered to take me to their apartment for the night. Was I ever so grateful to the good Samaritans! After staying overnight, I was picked up by my host family arranged by Rice. Only a small prestigious university would make such arrangements for incoming foreign students. I spent 3 days

with Dr. Meyers and his family. I got my first impression of affluent family life in the USA.

The Years of My Graduate Study

“All our dreams can come true. if we have the courage to pursue them.” - Walter Disney (1901 -1966 AD), American Entrepreneur, Cartoonist, Animator and Film Producer

At Rice University, I met three newly-arrived fellow students from Taiwan. We were all graduates of the National Taiwan University, but Rice was where we first met. We decided to share an apartment together to save expenses. The apartment was old with squeaky floors. It had 2 bed rooms, so each pair of us shared a bed room. We took turns to cook for ourselves. None of us had any cooking experience. We just threw all meats and vegetables together into a big pot and boiled them. Four of us stayed in there until I moved out when Jen-Ching came to Houston.

My immediate goal was to do well in classes and to save as much money as possible from a monthly stipend of \$222.22. My full scholarship was \$2,000 for 9 months. I rode used bicycles to school every day through the scenic neighborhoods north of Rice. I got all A's in classes competing against some of the best students in America. In 5 months, I saved \$300 to buy a used car. A fellow Rice graduate student who came from Taiwan a year earlier taught me how to drive. I practiced my driving skills in the spacious parking lot of the Rice Stadium until I had my first driver license.

Rice University has a splendid, heavily-wooded campus. Most buildings are of Byzantine type architecture with pillars and courtyards. Walking in the campus gave people serenity and inspired learning. The Chemical Engineering Department had around 20 students per undergraduate class and about 30 graduate students in total. The professors to students' ratio were high and they gave us plenty time for personal interactions. My shyness and English ability didn't help in that area. All the examinations and quizzes were carried out under an honor system. No professor was in the classroom watching student from cheating. That was a welcome surprise for me. I believed in intrinsic honesty and fairness of my fellow students. Frankly, I felt closer to Rice than to my undergraduate alma mater.

Five months later in February 1967 Jen-Ching came to Houston. We moved into an apartment just for ourselves. That was the beginning of a new phase of our lives. We were short in material possessions, for each of us came to America with \$300 and one suitcase of clothes. We were full of hope for much better and happier lives in the United States. We learned later the hope was called “American Dream”. Jen-Ching attended the University of Houston. We had a chance to meet Dr. Parrish who was the Foreign Student Advisor at UH. When I mentioned that I wanted to improve my English. He offered to tutor me for free. I was happy to take private lessons from him. The lessons

lasted for several months until he was too busy to continue. The lessons improved both my grammar and pronunciations. Besides, he helped me gain confidence in making English conversations. Dr. Parish was one of many people helped me in critical moments of my life. As a token of our appreciation, we presented him and his wife a very beautiful artistic silk shawl with embroideries of many colorful butterflies that Jen-Ching brought from Taiwan.

The apartment we first rented didn't have a working air conditioning. The hot Houston summer forced us to look for a better place. We were lucky to find a garage apartment at 2422 1/2 Sunset Blvd. The apartment was very close to Rice with a rent of \$75/month. The landlords were a kind senior couple, John and Lena Alexander. He told us that the garage apartment was built for his eldest son and daughter-in-law. They had since moved into a house of their own. The garage apartment was built on top of a detached 2 car garage, in the back yard behind their house. It had a large bedroom as well as a large living room, and a full kitchen and one bath room. Most importantly, it had a working AC. The Sunset Blvd. is a beautiful street with wide esplanades. Big oak trees line on both sides; their branches hang over and meet in the middle of the street. That was our 1st home. It was truly comfortable and cozy. We lived in the garage apartment for 5 years until I got a job at the NASA Johnson Space Center and moved to the Clear Lake area.

Not long after moving into the garage apartment, we found out that a scholarship of \$222 each month was too tight for two of us. Besides, our lemon used car, 1961 Buick Special cost us substantial money to keep it running. Jen-Ching decided to seek a job to help the tight budget. She dropped out from U of H after one semester. She learned typing and keypunching computer cards in a night school. Then she went to the Texas Employment Commission downtown Houston to look for a job. She was referred to the upscale Sakowitz Department Store where she was hired to work in the "Will Call" station (for lady customers to check in their coat and hat while shopping) in the store. She took the anglicized name Grace for the work. She walked 3 or 4 blocks to take bus to work and back every weekday. Goodhearted drivers sometimes gave her a ride from the bus stop back to the apartment. We never thought of any danger walking or hitching a ride in those days. Not long after her first job, Jen-Ching was transferred to the Audit Department in Sakowitz with a raise, as they recognized her mathematic skills. Throughout the 4 plus years her worked in Sakowitz, she never purchased any item for herself, even with a 20% employee discount. She only bought a lipstick for her mother as a gift. Jen-Ching's paychecks almost doubled our income, so we could save more. Within a year of her work, we bought a brand new 1968 Mercury Cougar to replace the lemon Buick. We also began to send money back to our families to pay back the airline tickets and pocket cash they gave us. We kept the send-backs long after the tickets and cash were fully paid back. We did until our parents passed away. After 4 plus years of working in the department store, Grace could carry on everyday conversation in English much easier.

Students at Rice got free admissions to Rice football game. Watching an American college football game for the first time was quite a new experience. All I saw was that a bunch of players fell in a pile, stood up and fell again. I didn't know the rules or how they scored. I also saw a large group of students worshiping Sammy the Owl like a pagan god. Anyway, all of us on the stand seemed to have fun at the game. Rice lost almost all our games that year, but that didn't stop the fun. I began to understand sportsmanship was not just winning but also participation.

I finished my 12 required graduate level courses at Rice in two years, getting all "A's". For those top grades, I was allowed by Rice to pursue a Doctor of Philosophy (PhD) degree directly, instead getting a Master of Science degree as an intermediate step. In order to do that, I had to pass Qualification Examinations in four specialized fields of chemical engineering. I took the tests and pass them in the first time. Had I failed to pass any of them in two tries, I would have been disqualified from the PhD program. I also passed German and French tests required. The tests were for reading scientific articles in German and French only. I wish I had learned conversation words in those two languages. After having passed the Qualification tests, a PhD candidate would pick a professor and get his or her consent to serve as the Principal Advisor for dissertation. Dr. Fritz Horn consented to serve as my Advisor. He was an extremely intelligent person, a genius in my opinion.

Dr. Horn was an Austrian-born, London-educated theoretician who had invented many new techniques for optimal controls of chemical processes. To prove some of his theories or explain his proposed techniques, computerized simulations and mathematical modeling were used. My research topic, which Dr. Horn selected for me to perform computer simulations of, was a new technique to separate chemicals. Dr. Horn worked with me to formulate mathematical equations that represented the new technique named "Induced Transport" by him. I was responsible for solving these equations numerically. I had to learn how to approximate the differential equations in our mathematical model with difference equations solvable by using a computer. That techniques were taught in a graduate college course called Numerical Methods that I took at Rice. The next thing to do was to use a computer to solve the difference equations. I knew nothing about computer at that time, never saw one or use one before I came to Rice. The IBM computer, central processor Model 1040 just came to the market. Rice University bought one for research. The computers in their dawn era were no more than machines that could do additions and subtractions faster than human beings and could do those computations tirelessly. Human beings had to give commands to the IBM computer in a specific computer language - FORTRAN to do the calculations human wanted. In short, I learned all these skills and language in 3 months by reading text books and manuals with no teacher. Then I was able to use the new IBM computer at Rice to work on my dissertation.

Not long after assigning my research topic and giving me a few ideas on the chalkboard in his office, Dr. Horn took off for his sabbatical leave (once every seven years for a college professor) in University of Natal in South Africa. I was left to do the research by myself. It was fairly difficult to communicate with him. E-mails had not been invented for another two decades. Long distance phone calls were too expensive for a graduate student stipend. Anyway, he could not help me much. Being a theoretician, knowledge of using computer wasn't in his repertoire. I had to carry out my research almost independently. I thought that Dr. Horn would come back to Rice when his sabbatical year ended. But by the end of that year, he wrote me that he was not coming back to Rice. Dr. Horn was going to take an endowed professorship at Carnegie-Mellon University in Pittsburgh. I asked him what I should do with my dissertation. He instructed me to write up the equations and ideas we discussed in his office 15 months ago. Following the theoretical part, I described my work on the computer. The conclusions of the research were that his new proposition of "Induced Transport" would work and that the new method to separate chemicals was validated by computer simulations, instead of by experiments. It took me about 7 to 8 months to write my dissertation based on his outlines. We typed up the first draft. Dr. Horn reviewed the manuscript and made substantial changes, completely rewrote several chapters. The final manuscript was reviewed by him and two other faculty members at Rice. They formed the oral examination committee of my thesis. Dr. Horn picked a date. He flew back to Houston to chair the oral examinations. The committee members asked some questions which I answered. The committee held a deliberation while I waited anxiously outside. They came out in less than 15 minutes and congratulated me on passing the examination. I was one of Dr. Horn's last two students at Rice. It was hard and easy to work for a genius like Dr. Horn. The hard part was to meet his expectations. The easy part was that he modified the work himself to his satisfaction. Later in my life, when I wanted to modify a technical report for my approval, I endeavored to explain my rationales for the changes needed.

Journey to Find My Dream Job

"Success consists of going from failure to failure without loss of enthusiasm" - Winston Churchill (1874 - 1965 AD), British Statesman, Historian and Author

I was conferred a PhD by Rice University in June 1970, 4 years after I began the graduate study. That was 1 to 3 years ahead of the norm. The speed in getting the degree contributed to the difficulty I had in finding a desirable job immediately. I was unprepared to take an assistant professorship in an average chemical engineering department because my English needed substantial improvements. My dissertation work, being theoretical and computational, was not easily understandable to managers of industrial research laboratories. I had job-interviews with some major Labs including DuPont, Shell and Dow, all unsuccessful. The "Induced Transport" process was ahead of its time. My difficulty in finding a job notwithstanding, both Grace and I wanted to stay in America, the land of opportunities. The people we had met and dealt with were friendly and courteous. Living cost in America was relatively low considering the incomes. The climates in Houston

were like the climates in Taiwan, with AC available almost everywhere indoor. We loved Houston and wanted to stay in America even it meant for me to take a relatively low pay post-doctoral research position at Rice. That was exactly what I took.

The post-doc project at Rice was led by Dr. Larry McIntire, a rising star in the emerging field of bioengineering. We tried to analyze human circadian rhythm with mathematical equations and computer simulations. I continued my search for a job in chemical industries. I didn't have any success as the year flew by. I was wondering again what I should do next. A Chinese poem "The road seems ended as I look at mountains behind mountains, creeks crossing creeks. In the shadows of willows and the bright blossom of flowers there is another village ahead. 山重水複疑無路，柳暗花明又一村。" best described my job-searching situation at the time. Dr. Sam Davis, a professor of chemical engineering at Rice and a member of my dissertation review committee, came by my desk one day. He asked me "Chin, there is a post-doc research position at NASA Manned Spacecraft Center (later renamed Johnson Space Center, JSC). Would you be interested in that?" I jumped at the opportunity. Dr. Davis drove me to JSC to have an interview with Mr. Wilbert Ellis, supervisor of the position. Wil offered me the position at the end of the interview. A chemical engineer, who could not find his road in chemical industries, now saw a new village - the American Space Program ahead. I was to start the post-doc position sponsored by the National Research Council in August 1971. I am grateful to Dr. Davis for pointing a new direction for my career. As he was a consultant for NASA and a reviewer of my dissertation, he was the only person who could connect my computer skills to the post-doc position at NASA.

On July 20, 1969, like millions of people around the world, I watched on TV with awe the first human landing on the moon. I thought that the achievement was the apex of human technology up to that time. In my wildest dream, I could not have imagined of possibility of taking a job associated with the Space Program. I got my foot into the door of the space program with the year-by-year post-doc appointment. I was determined to not let the opportunity slip away. I had to work hard to my full capacity at the position to realize my new dream.

The techniques that I applied in my dissertation and the Rice post-doc work, mathematical modeling and computer simulations were useful in my new job. I used the techniques to develop computer simulation of a fuel-cell type electrochemical system for removal of carbon dioxide (CO₂) from the air in spacecraft cabin. CO₂ removal is a major function of a spacecraft life support system. The electrochemical system was a new technology being developed for long term space travel, due to its low requirements of consumables. The work that I did proved the viability and advantages of the new technology. However, NASA didn't develop the new technology to its maturity, due to a budget constraint. I did publish two technical papers on my research. From then on, mathematical modeling, computer simulations and spacecraft life support system had been the major areas of my work. Instead of being shelved in an ordinary job in chemical industries, my

efforts in the dissertation and post-doc work at Rice formed a strong foundation for my career in the space program.

After finishing the two-year post-doc appoint in 1973, Wil Ellis wanted to hire me to work in his group. Wil is a very nice and down-to-earth person. If I could choose my boss in my career, he would be my first choice. He is very intelligent. When he assigned me to analyze a problem, most of the times he already knew the answers. He just needed my analyses and computations to back him up. My hiring also required approval of Wil's boss, Mr. Walter Guy. Walt fit the descriptions of a "Type A" person to a T. Many of his subordinates were afraid of him. However, Walter treat me fairly and never dressed me down. I believed that my capabilities and work ethic impressed both Walt and Wil positively. The only but decisive issue against me being hired by NASA was that I was not a US citizen in 1973. Although I had become a permanent resident of US when I had the PhD degree in 1970, I had not fulfilled the 7-year waiting period required to become a US citizen. Therefore, I could only work for a contractor of NASA, Lockheed Electronic.

During the 7 years with Lockheed, I was quite productive. I converted the 41-node model of human body to a computer program. I developed a thermal model of the extra-vehicular space suit and integrated the two models. The integrated model/computer program has been used to predict the thermal conditions of an astronaut working outside of space cabin. It is still in use forty-some year after my initial development. I developed computer model/program for analyses of a new CO₂ removal technique - Molecular Sieve. The Lockheed group had 5 employees led by David Cook. I worked very hard and got along with them well. Grace and I were naturalized and became US citizens in 1977. But NASA could not hire me right away. NASA had a force reduction and hiring freeze after ending the Skylab Program. I was hired by NASA in 1980. After 10 years, I finally had my dream job.

The Joys of Raising Two Sons

"You are the bows from which your children as living arrows are set forth." - "On Children" by Kalil Gibran (1883 -1931 AD), Lebanese-American Poet and Writer

One of the most wonderful and marvelous events in my life happened on March 18, 1971. Grace gave birth to a big healthy baby boy (8 pounds) with a full head of dark hair. Grace weighed for less than 100 pounds herself. We named him Alexander Sean after our kind landlord, John Alexander. We also gave him a Chinese name 林立德, meaning "to establish in Texas". He was, and still is the joy and pride of our life. 3 days later, Grace and Alex were discharged from the hospital. The United Way of Houston sent a lady to help us for 5 days and to teach us how to hold, feed and bath the baby. From then on, all we had to consult was the book "Baby and Child Care" by Dr. Benjamin Spock. 3 months after Alex was born, we traveled back to visit our families in Taiwan. It was a long trip each way. The flight each way took more than 24 hours with two

stops to change planes. We didn't buy a seat for Alex on the flight to save money. In the whole flight, Alex was sitting or sleeping on Grace's lap. It was very uncomfortable for both Grace and Alex. After our arrival in Taichung, Grace and I took Alex to pay tribute to my mother at her resting place. We also visited the resting place of Grace's father nearby. He passed away a few months after Grace left for America. Her family did not tell her the sad news until about one year later. We were not able to be with either my mother or Grace's father when they passed away because of the cost and hardship in traveling on those days. Our families honored their wishes to not notify us of their grave illness. I wished that my mother could have seen her big boy grandson. Grace wished the same for her father too.

Three of us moved into an apartment on NASA Road 1 next to JSC. JSC has a beautiful campus with contemporary style buildings. Working in the quiet and clean environment made up for the relatively low salary of a post-doctoral position comparing to an engineering job in chemical industries. Grace had resigned from Sakowitz one month before Alex was born. We were back to a one-income family. However, we were still able to save some money. Near the end of each year of the post-doc appointment, we had enough funding to take a vacation to go to Grand Canyon and California.

Alex was less than 3 years old when we went on the first vacation. We didn't want to confine him to his child seat for the whole 10 hours that we drove each day. I took the old mattress of his crib and made it into a bed on the backseats of the Mercury Cougar. I cut a square off a corner of the mattress to allow space for the child seat. They fitted well together. It was the first time that I solved a problem at home with my practical engineer's mind. That sort of makeshift backseat/bed could never pass the safety standards of today. The scenery of Grand Canyon was awesome. Grace and I were impressed by its beauty and majesty. On the way to California, we stopped overnight at Las Vegas. That was the first time we ever saw and entered a casino. I gambled and lost some money. Grace had no interest in gambling at all. We drove to Los Angeles to visit Disneyland. That was the highlight of our visit to LA. The not-so-nice part was that our 1968 Mercury Cougar broke down in LA. In 1960 and 70's, American cars were made to be problem-free for first 3 or 4 years. After the warranty period expired, problems happened. We had to spend a substantial part of the cash money we brought for the trip to repair the car. I was lucky to leave Los Vegas without losing all our money.

The next year we went to vacation in the Rocky Mountain National Park. As we drove on Interstate 25 from Colorado Springs to Denver, we saw many crazy red rock formations. Alex spoke quite a few words of Chinese at the time. He had often heard his mother praising him in Chinese “能幹!” (English translation: Atta boy!). When we drove by one of formations similar to the famous “Balanced Rocks” in the Garden of the Gods Park, Alex shouted out in Chinese “石頭能幹!” (English translation “Atta boy Rocks”). That was the most memorable event of the vacation. We stayed in a cabin in Estes Park, Colorado. The view from the cabin was so serene and peaceful, I wished someday I

could retired to live in beautiful place like that. Grace reminded me that she wanted to retire in a suburb near a super market, a department store, doctor's offices and a few restaurants. Of course, her was always more realistic. I didn't think either of us would enjoy retirements in the mountains without modern convenience. We hiked for a little while and dipped our feet in a beautiful creek. I couldn't help recalling part of a classic Chinese poem “振衣千仞崗，濯足萬里流, Winds blew up my robes as I stood on top of a thousand-meter high cliff. Water washed my feet as I walked in a creek flowed for ten-thousands of kilometers.” by Zuo Si (左思 250 -305 AD). I drove on the beautiful scenic route on the mountain road. On one side of the road was a stiff mountain and on the other side was a thousand-feet drop cliff. I did not know that I was supposed to shift to a low gear coming down the mountain. My foot was on the brake pedal most of the trip down. Fortunately, we reached the city Colorado Spring safely.

We had since visited countless beautiful scenery in our vacations. However, we always regard Houston, Texas as our hometown and home state. Houston is a diverse and dynamic city with the fourth largest city population in the USA. Houston has first-class museums and theaters. Its vibrating economy has strong foundations based on oil, medical, bio-technology and space industries. Winter in Houston is mild; rarely do we have freeze or snow. Summer is hot and long; but indoor air conditioning is almost everywhere. Texas is a beautiful land of people with big hearts. Each year in the spring, the bluebonnets, Indian paint brushes, primroses and other wild flowers bloom from south to north drenching the countryside with hues of blue, red, yellow, pink, and purple. The living cost in Texas is low. Texans are friendly. They are helpful to people coming to settle in their new homes.

Soon after I joined Lockheed, we decided to buy a house. Owning a house was a major part of our American Dream. On the north side of NASA/Clear Lake area, the developer - Friendswood Development Company just began building two subdivisions. We visited the model homes for the Middlebrook subdivision. Grace and I liked all models. We agreed that we could afford the price of \$34,000 for one of the 3-bedroom model. The Price was about 2 years of my salary. With our good credit ratings, we secured a 30-year loan. After 3 months for building the house, we moved into our new house at 16306 Cavendish, near the end of 1973. The red-brick house is on a corner lot near a cul-de-sac. It has 1830 square feet with a huge backyard. In addition to the three bed rooms, it has a high ceiling living/dining room, and a family room with fireplace. To us, it was like a mansion. It was our home for the next 17 years.

Near our house, a new elementary school had been built in 1976. When Alex was ready for kindergarten, we took him to register in the brand-new Armand Bayou Elementary. It was about a 10-minute walking distance away. After walking with Alex for the first few days, Grace let him walk to school by himself. I was happily amazed that he could do that. Safety of children seemed not to be an issue in our neighborhood at the time. Were we too unsophisticated? That was normal in those days. Alex had a much smoother start

for schooling than I did. We rarely checked on how he was doing. His report cards were all good, just like I had in my school years. We were happy and content with that. Neither of us was a Tiger parent. Alex played baseball in the cul-de-sac with his friends after school. One day his face was accidentally hit by a baseball bat and all swollen up. Neither Grace nor I knew what emergency care we should take. We took him to see the doctor the next morning. He was lucky to not have any broken bone, but his face tissue was smashed hard. As a result, he lost his cute dimple on the right side of his face. Nevertheless, he continued to be active in neighborhood sports. Nowadays, plays softball and basketball after work. He is much adept in sports than I was.

Our finance improved as years went by. We invited my father to come to live with us in 1974. He joined a Taiwanese-guided group tour. The group visited many popular tourist attractions in the United States. After the tour ended, he flew to Houston. The long tour and travel didn't wear him down, because he was used to long travels in his younger years. He lived with us for 4 months and seemed to enjoy living with us. The only things bothered him was probably the feeling of isolation, although he never complained about that. We didn't have Chinese newspaper or Chinese TV in Houston. He translated an old radio operating manual into Chinese for fun. After we told him the good news that Grace was pregnant again. He decided to go back to Taiwan, because he didn't want to burden us when our second child was on the way. Back in Taiwan, he told my sister that Grace was a good housewife because she didn't waste things or money. The comment was consistent with my father frugal habits.

A few months later, Grace's mother came to visit us. The primary objective of her visit was to help us in anticipation of the birth of our second child. We really appreciated her traveling of thousands of miles and temporarily giving up her comforts in Taiwan to help us in the critical time of our life. Our second child was born on August 14, 1975. It was another beautiful healthy big boy (7 lbs. and 10 oz.). Grace and I agreed that we would call him in Chinese 林安德, meaning "settle down in Texas", and Andy in English. What I really had in mind was Andrew. I might not have conveyed my thought to Grace clearly. When the hospital asked her for baby's name to record on the birth certificate, I was at home to catching some sleep. She gave them Andy as the first name and could not think of anything for the middle name. That was it, short and unique. Grace's mother stayed and helped for 4 months. Her help gave us time to learn how to take care of a 4-year old and a new-born at the same time.

In 1971, The University of Houston - Clear Lake (UHCL) was established in the campus across the street from our subdivision. The school had taken in many local students who wanted to learn skills for well-paid jobs. Our friend and neighbor Shinyee Lee (張心儀) who was already admitted into UHCL recommended the school to Grace. She also recommended that if Grace wanted to restart a professional career, computer skills were in demand. Listened to her friend, Grace applied for admission to the Computer Sciences Department of UHCL in 1977. Surprisingly, she was admitted contingent upon passing a

college level examination on Mathematics. The examination was expected to include Algebra and Geometry. Grace had a rather solid foundation on Mathematics formed in her high school years. However, she had not touched them for over 15 years. To prepare her for the examination, I wrote down a summarized review of Algebra and other mathematical topics in 4 or 5 sheets of notepad papers. Grace crammed all those notes in a few summer weeks. She took the examination and passed it. Did we have a gifted student or a great teacher here? Might be both? Anyway, she began to take computer courses at UHCL. I helped her studies by reading her textbooks, too. Some of those courses, I had zero knowledge of them before I read the books. I had gone through a similar learning process at Rice, what a déjà vu!

Grace Restarted Her Career

“A woman is like a tea bag, you cannot tell how strong she is until you put her in hot water” - Nancy Reagan (1921 - 2016 AD), Former first lady of the United States of America

Before Grace could finish her study at UHCL, a local contractor of NASA, Computer Sciences Corporation (CSC) began hiring in 1978 for their new contract to serve as operators of the computers at JSC. Grace applied for a job with CSC. All stars and planets had to align correctly, she was hired. From there Grace started her professional career which lasted 32 years, mostly in Space Shuttle support, until she retired in 2011. She retired with thousands of co-workers as the USA space shuttle program ended in that year. When we looked back at those years, the startup and sustainment of her career were truly amazing. She always feels very privileged to be a member of the Space Shuttle supporting team from the beginning to the end.

With Grace taking a full-time job, we had to send Alex and Andy to a child care place named Pickwickian School. Andy was cared from 8 to 5 and Alex for after-school hours. The child-care situation was hard for our children. The school wasn't good by today's standard. However, it was necessary for two careers and the school was the only one nearby. Another objective we had to give up after Grace's full-time job was teaching Chinese to Alex and Andy. It was a difficult job from the beginning to teach them a language that they didn't speak outside of our home. Alex remembered some Chinese after we gave up. He still can understand some Chinese conversations and write his Chinese name. On the other side, we improved our English as we learned from them. In 1979 Grace and I traveled with Alex and Andy back to Taiwan to visit our families. Because they could not speak Mandarin, I wrote down their names and contact information in both Chinese and English on a piece of paper and put the paper in their pockets. Just in case that they were separated from us, police would know how to contact us. In that trip, they met grandpa on my side and grandma on Grace's side. They also met aunts, uncles and cousins on both sides.

With CSC, Grace worked in JSC Building 12 where she was a member of the CSC help-desk group. Computers were new and challenging to many people. Even at the high-tech

Johnson Space Center, users of the central computers in Bldg. 12 encountered problems. The help-desk provided consultations to the users. Grace's job at the help-desk was to direct those questions to the computer experts in the group. She was very good at interfacing with customers and experts. Not long after Grace joined CSC, she decided to suspend her study at UHCL. The responsibilities of a full-time job and mother of two young kids plus taking courses at UHCL were just too overwhelming. She never finishes her master's degree. One and half years later, she got another job with Ford Aerospace, which was also a NASA JSC contractor. The Ford group supported Missions Operation at JSC. Her job required some computer programming skills. She learned the skills on the job. She had a high EQ and she was a team player, getting along with her colleagues well.

The knowledge that I gained from helping Grace's course work was also useful for myself at my job. For example, knowledge I gained on Assembly Language enabled me to dissect my own computer programs and found errors. I could debug quickly the computer codes I wrote. By the end of my job with Lockheed, I was not only a good engineer, but also a good computer programmer. Although I no longer wrote computer program after joining NASA, I understood the nitty-gritty of the engineering and computer programming work that I oversaw. Having been a player made a better coach. Both Grace and I were grateful to UHCL for coming to our community at the right time, at the right place and in a right way.

An Aerospace Technologist Getting Started

"The secret of getting ahead is getting started." - Mark Twain (1835 - 1910 AD), American Author and Humorist

NASA offered me a GS-13 Aerospace Technologist position. The strange title was to avoid calling us "Engineers" which had special license requirements at the State level. GS-13 was the average grade for JSC employees. According to an unofficial estimate, one third of JSC employees were under 13, one third at 13 and one third above. I was just happy to start the job I wanted regardless of the grade. My job in the Systems Engineering Branch (Code EC2) was to analyze designs, processes, test results, and operations of spacecraft systems for which the Crew Systems Division (EC) was responsible for. My boss, Wil Ellis had a caricature hanging on the door of his office. The caricature showed a group of people led by Wil looking at a giant crystal ball. That was how our colleagues thought of us.

On April 20, 1980, I reported to work at JSC. An incident happened that same day in the EC Laboratory in testing of the new space suit backpack for Space Shuttle Astronauts. The oxygen line exploded during charging of the oxygen bottles in the backpack. A technician suffered a mild burn to one of his arms. The incident had major potential impacts. It stopped the certification of the backpack and subsequently the new space suit, until we

could determine the causes of the incident and found solution for the problem. The stoppage could have delayed the Space Shuttle Program.

The whole analysis section led by Wil, including its newest member joined the investigation. We did a lot of computations to support the investigation. After a few weeks, the team determined the plausible cause of the explosion and made recommendations. It concluded that the explosion was possibly ignited by the heat created in the rapid charge of the oxygen bottles and aluminum debris left in the tube bend by the manufacturer. The recommended solutions were flushing and cleaning out any debris thoroughly, and slowing down the speed of charging the bottles. The quick investigation and turnaround in the certification of the new space suit minimized the impacts of the incident on the Space Shuttle Program.

My major task after the incident investigation was to support the thermal certification tests of the new space suit. The tests were held in the smaller one of the two huge vacuum chambers in JSC Bldg. 32. The bigger one, Chamber A is 16.8 m (55 ft.) diameter X 27.4 m (90 ft.) high. It was built to test the Lunar Landing Vehicle of the Apollo Program. The smaller one, B is 7.6 m (25 ft.) diameter X 7.9 m (26 ft.) high. It was built to certify a duplicate of the suit worn by Neil Armstrong when he stepped on the Moon. Both are U. S. History Landmarks. Just walking into the Space Environment Simulation Laboratory (SESL) where the Chambers were, I felt the inspirations of the epical achievements of the USA Space Program. A test subject, real human wore the Shuttle spacesuit being test in Chamber B. Scores of temperature probes connected the suit and the test subject's body to the data collection computers. My job was to sit on the data terminal, watch the data collected, and made calls when data were stable or "reached a steady state". The data we collected were correlated to the thermal model of the spacesuit. The model was verified and could be used with confidence. As the original developer of the model, I felt like a parent watching his child getting a college diploma.

On April 12, 1981, the Space Shuttle (Space Transportation System -1) was launched. The launch started another great era of NASA after the moon-landing Apollo Program ended in 1972. The first orbiter, Columbia carried only two astronauts in the first manned test flight. Like most of the people of JSC, we watched on TV the beauty and glory of the firing of the rocket boosters and the Shuttle main engines. We were all in awe and speechless. The event made us all proud of being members of the team whatever insignificance our individual roles might be. The manned test flight of the first STS safely landed two days later. Again, we all watched the landing on TV. When Columbia finally stopped on the runway, everyone applauded and breathed a sigh of relief.

The first extravehicular activities (EVA) of the Shuttle program took place during the STS-6 mission on April 7, 1983. The thermal model of the space suit was used for the planning of the EVA. Wil and I watched the EVA in our conference room for real time

support. We never got any call from the mission support team. That was good, because it meant the EVA had been completed without any thermal problem.

In parallel to the Shuttle program, NASA started planning for its next program - the Space Station. Developments of the technologies required for the Space Station preceded its design. Between the Johnson Space Center and the Marshall Space Center in Huntsville, Alabama, there were debates and competitions for what technologies were required for the thermal control and the life support systems of the Space Station. Whichever Space Center won the debates and competitions would have a lot of funding from the NASA budget. By that time, Wil had been promoted to the Branch Chief position. A senior aerospace technologist in our group, Bill Morris took the Section Head position. Wil, Bill and I were members of the JSC team in the debates. We traveled together to Kennedy Space Center, a neutral site for the debates between Marshall and Johnson. The travel and the camaraderie during the debates made us closer. Two managers from the NASA Headquarters were the judges of the debates and competitions. They made a split-in-the-middle decision. JSC had the thermal control system and Marshall had the life support system of the Space Station. Since then, the work of the Branch at JSC has been refocused on thermal control. Even the name of the Branch was changed to Thermal Systems Branch.

For the thermal control systems, there were two new technologies in our considerations. One was the heat pipes. Small heat pipes had been developed for cooling of computer chips which generated intensive heat. To apply heat pipes for dissipating heat from a spacecraft, they needed to be scaled up 50 to 100 times longer to span the length of a space radiator panel. The advantages of heat pipes over flow-through tubes was they could suffer penetrations by a meteorite or space debris without losing the whole space radiator panel. The damage would be limited to one of the multiple heat pipes. The disadvantage of the heat pipes was that there were uncertainties on how to “prime” or to start up the heat pipes in a zero-gravity environment. We built some long heat pipes and tested them. However, the tests were carried out in the 1-g environment. The heat pipes worked but the technology development was suspended after the tests for budgetary reasons. During the development of the heat pipes, I worked for two summers with a visiting research scientist from Kansas Institute of Technology, George “Bud” Peterson. Bud continued research on heat pipes after returning to his teaching job. NASA funded some of his research projects. Eventually he developed into a renowned heat pipes expert and a distinguished professor and college administrator. Currently he is the President of Georgia Institute of Technology.

Another technology area to be developed for the Space Station thermal control was utilization of two-phase flows. A two-phase flow system uses the latent-heat of evaporation, instead of sensible heat of the working fluid. The flow rate of the working fluid needed to be pumped in a two-phase thermal control system would be 30 times less than that of a single-phase one. After an analytical study, the two-phase concept was abandoned, due to

the limited advantage it could achieve. Someday in the future, if NASA is to establish a colony on the moon, we might want to study the two-phase flow technology again.

To support the technology developments, I had read many books and technical journal articles about heat pipes and two-phase flows. I had developed codes for computer simulations of two-phase flows. I participated in the heat pipes testing. The efforts and experience contributed to my qualifications as a thermal control system expert. Those qualifications led to my first promotion in NASA, from GS-13 to GS-14 in early 1986. I didn't have time to celebrate my promotion because a disaster and tragedies soon hit us.

Disaster and Tragedies

“The crew of the Space Shuttle Challenger..... slipped the surly bonds of earth to touch the face of God” – President Ronald Reagan (1911- 2004 AD), 40th President of the United States of America, in his speech after Shuttle Challenger explosion

After successful completions of twenty-some Space Shuttle missions, a Space Shuttle launch seemed to be a routine event for the people at JSC not directly involved. In the morning of Jan. 28, 1986 when Shuttle Challenger was launched, I was working in my office, not watching it on TV. Suddenly, I heard someone shouting in the hallway “It blew up! It blew up!” I rushed to the Division auditorium to watch the TV broadcasting of the launch. I saw scores of my colleagues in the auditorium; all of them were in pain and shock, some of them in tears. One of the rocket boosters of Shuttle Challenger exploded due to an O-ring seal failure. We had lost seven astronauts in the disaster. I did not know any of the lost astronauts personally. But I felt like losing 7 members of my family. A few days later, President Reagan came to JSC for the memorial service of the lost astronauts. The biggest JSC auditorium, Building 2, didn't have enough capacity to hold all attendees of the memorial service. The service was held in the central courtyard. That was the first time I saw a President of the United States in person. I wished that it had been a better occasion. President Reagan gave a very moving speech and encouraged us to carry on the exploration. The disaster caused a 32-month pause for the subsequent Shuttle schedules while NASA redesigned the solid rocket boosters. For those of us not involved with the Shuttle boosters, we were told to concentrate on our regular assignments. That was the best way for us to work through the difficult period for all JSC employees. It was exactly what I did until the next tragedy hitting even closer.

My supervisor Bill Morris was a nice and gentle person, sometimes he looked pensive or even depressed. After the Shuttle disaster, he looked extraordinarily sad and tired. We thought that the disaster had affected him more than us. He might be tired of having to drive for 40 miles in more than an hour each way to work and back. In early April 1986, he took two weeks of sick leave. We had no knowledge of his illness. When Bill came back from the sick leave, he told us that he was in treatment for depression. He told us that with medicines he would pull himself out of the depression. About 10 days later, I received a shocking call from Wil. Bill had shot and killed himself. It was another

shocking tragedy in less than 3 months. The next day when we went back to work, some of us were in tears. We all went to the memorial service for Bill that week end. We learned that Bill was further depressed because his wife was asking for a divorce.

We needed a new Section Head. A couple weeks later Wil called me into his office and told me that he wanted me to take over the job. The change was a lateral move with no promotion for me. More important for me, it was a switch from technical ladders to managerial ladders. I asked Wil for time to consider the move. I had to ask myself if I could handle the supervisory responsibilities. I was confident that I could. Did I want to move to the managerial ladders? I went home and talked to Grace. I don't remember her words exactly. Her advices were "I know you are very sad about Bill's passing, and you like your technical work very much. But this is an opportunity presented to you to expand your capabilities. Since your boss asked you to take the new responsibilities, you should take the new position and try it at least for a while. If you don't like being a supervisor, you can always go back to the technical position. But if you do not take the managerial position offered to you this time, you probably will never know whether you are a good manager or whether you like to be a manager." With encouragements from Grace, I told Wil that I accepted his offer. The tragedies drastically changed the direction of my career. I became the 1st Asian immigrant to hold a managerial position in JSC. My breakthrough helped diminish the stereotype that Asian immigrants were only good in technical positions. Later I became the first Asian immigrant Branch Chief in JSC. I never had any second thought about the switch in my career. However, I could not help from wondering sometimes how high I could have advanced on the technical ladders.

Out of my respect for Bill Morris, I didn't move into his single office or use the large desk in it for several weeks. I stayed in my office with two office mates. I only used the conference table in the single managerial office for meeting. That kind of thinking was ingrained in my mind by Chinese teachings. I finally moved into the single office because I felt the uneasiness of my office mates. My management style was low-key with a firm handle on assignments of the section. I tried to talk to every member of our section for a few minutes every day. In this way, I kept up with the progress of their assignments as well as their personal feeling on the job. I helped my group solve problems with all the resources I could muster. My office door was open all the time, and I answered all phone calls as soon as I can. I was result-oriented. We always met deadlines for our assignments. Good will begat more good wills. Lead by examples and collaborations made a team stronger. Most days I was the first one of my section to arrive at work and the last one to leave. I had no people management training before taking the position. I just followed the experiences and lessons learned since my high school years when I was a student leader.

Soon after the Challenger disaster, the Ford Aerospace contract with JSC ended. Grace found a job with Unisys Corporation which supported the Shuttle operations. The delay in the Shuttle program gave Unisys time to train a new group of computer programmers,

including Grace. After working on developing or revising computer codes for a while, she was assigned to the computer program verification group. She liked the less stressful verification job and stayed in the verification group until her retirement. Later the Unisys contract merged with the Rockwell Shuttle Operations support contract. As the merged contract was replaced by a United Space Alliance (USA) contract, she moved with the verification group. The contracts had undergone many changes, Grace always weathered the changes.

Dynamical Reorganizations

"There is nothing permanent but changes." - Heraclitus of Ephesus (535-475 BC), Greek Philosopher

Not too long after I became a supervisor, JSC went through a center-wide reorganization. The reorganization eliminated one level of supervisors. All sections were abolished and all section heads became a Deputy Branch Chief. I was one of Wil's 2 deputy chiefs. The other deputy was Jim Jaax. Jim is also a nice person, very intelligent, organized and meticulous. Wil generally let me handle the business of the section that I used to lead. Soon after that Walt was promoted to be the Chief of Crew and Thermal Division. He promoted Wil away from our Branch as his Deputy Division Chief. Jim Jaax took over as our Branch chief. Wil and Jim both grew up in small towns. They are down-to-earth Americans whom I admired.

The Division wanted to hire a mechanical engineer to carry on my previous assignments. Instead of a new hire, the Human Resources assigned a transferee from the Los Alamos National Laboratory to work in our group. Unfortunately, the transferee could not perform satisfactorily and had to be transferred out again. Finally, we interviewed a new PhD graduating from University of Houston. We hired Eugene Ungar, a fine gentleman and a finer mechanical engineer. He fitted in the position very well. Gene went on to achieve and contribute a lot to both the Space Shuttle and the Space Station Programs. I am glad to be instrumental in the beginning of his career. Gene did not like bureaucratic paper work. To let him focus on technical issues, I did not mind taking care of the paper work.

We had good staff in our Branch and the team worked together well. As a dynamic organization, changes often took place before everyone settled in his or her position. Not long after assuming his Branch Chief position, Jim moved into the Division staff. Our Branch Chief position was open for meritorious competitions. I was ineligible to compete, because I had less than one year of supervisory experience. Walter selected Richard Bullock from the Structures Division as our Branch Chief. Although we never met before, Richard and I got along well. I did my best to support him in a new environment for him. Again, it didn't stay settled for very long, Walter left the Crew and Thermal Systems Division (EC) to lead a newly established Robotics, Automation and Simulation Division (ER). Wil took over as the EC Division Chief. In 1991, He re-organized and split

EC2 into two branches, a Systems Analysis Office led by me and a Special Projects Branch led by Richard. The Systems Analysis Office later evolved into the Thermal Systems Branch. As a Branch Chief, I was promoted to GM-15. Mrs. Sue Bobo was assigned to our Office (Branch) as the Office Administrator. Sue is very kind and friendly. She has a college degree majoring in English. I asked her not to hesitate in correcting grammatical errors in my writings. She did just that and I truly appreciated it. On the other side, Sue appreciated my way of conducting businesses – straightforward, honest and no corner-cutting. She is also an efficient and meticulous administrator. We shared many stories about our families. Our partnership in office had worked out well for 17 years until I retired. We kept in touch after our retirements. Our friendship would last even longer, for life.

The Materials Lab and Softgoods Lab in the Division were incorporated into the Branch I managed, although the Labs were technically directed by Dr. Frederick Dawn (唐鑫源博士). I was happy to provide budget and personnel managements of the Labs for Dr. Dawn, a world-renowned Space Textile Materials expert. Dr. Dawn was born into a prominent family that owned several modern textile factories in China. He came to study textile engineering in the United States in early 1950's. After getting a doctoral degree, he joined the National Advisory Committee for Aeronautics, the predecessor of NASA. When NASA began the manned space program, he was a member of the team that moved to Houston to the Manned Space Center. After the Apollo 1 incident in which 3 astronauts lost their life on the cabin fire, NASA was under tremendous pressures to develop a nonflammable fabric for the new Apollo space suit. In a tight schedule, Dr. Dawn led his team in the development of the Beta Cloth fabric that was used for the outer layer of the Apollo lunar landing space suit. The contributions were monumental and everybody in JSC respected him. Dr. Dawn was always cordial and dignified. He spoke with authority but in a humble manner. Dr. Dawn held the highest technical position of all Asian immigrants in JSC. I learned from him a lot of knowledge of space textile materials as well as on how to balance dignity and humility. He was my role model at work.

Guiding and Supporting Our Sons to Adulthood

"If you want children to keep their feet on the ground, put some responsibility on their shoulders." - Abigail Van Buren, Author (pen name) of the Column "Dear Abby"

While experiencing rapid changes in my work, we had to take care of child and adolescent developments of Alex and Andy. There was no role model for us in these areas. The ways of our parents had to be significantly modified from one culture to another, from one era to another. However, the essence of child care was love that stayed unchanged from east to west, regardless of time. One of the Chinese ways to show love was to provide everything for the kids to succeed. In return, the parents had high expectations and upheld strict disciplines. Fortunately, Alex and Andy both excelled in their school works and didn't have any behavior problem in schools. Following the American way, they both worked after school in the senior year of high school. Alex worked in a

dry-cleaner. Andy worked in a restaurant. Like many American kids, Alex participated in team soccer from elementary school through his freshman year in high school. We attended took him to practices and attended most of his games. Andy played soccer for 1 year but dropped out for lack of interest. They both took private piano lessons. Andy played longer than Alex did. They both played string instruments, viola and violin respectively in their school orchestras. On the art and music sides, Andy were more interested in and spent more time than Alex did. We went to almost all their school functions that parents were invited to attend. We provided their material needs within our abilities. We seemed to have done all we could. What we did not understand at the time was paying attention to psychological aspects of child development. Alex graduated from Clear Lake High School in 1989, the best high school in the best School District of the greater Houston area. His GPA was almost perfect, except missing an honor class in his freshman year, because we didn't know the significance of honor classes. Anyway, he was still ranked highly enough (#7 of the senior class) to be admitted to the Electrical Engineering Department of the University of Texas (UT Austin). When he was ready for the college, I bought some inexpensive furniture for him. I rented a U-Haul truck and drove with him 200 miles away to Austin. We helped him settle in an apartment. From then on, he took care of himself independently. Grace and I drove to Austin to visit him several times when he was in UT.

My father passed away in January 1990. In the last two or three years of his life, he gradually lost skills to care for himself. He passed away in an assisted living home near my brother's house. After receiving the bad news from my sister, I went back to Taiwan for the funeral. He was lay to rest with my mother. My father did not leave me any material asset. There was a gold ring from my mother that he kept for me. I gave the ring to my sister. What he passed on to me are an intelligent brain to learn sciences and engineering and a disciplined mind with good work ethic.

In March 1991, we moved into a brand-new house in the Brookwood subdivision about 1 mile north of Johnson Space Center. The developers began to build new houses in Brookwood since 1989. The new subdivision was just across the street from our old one. Grace and friends went to check out the model homes built by the Weekly Homes and the Village Homes. We liked the Greenhurst floor plan of the Weekly Homes and bought one located at 4315 Mountain Flower Court, Houston 77059 for \$194K. After selected the site and the floor plan, Grace got to pick many building materials and colors for the new house, from bricks to wall papers. She had a lot of fun doing that. Since we lived nearby the building site, we checked the progress frequently. We watched the house being built from the foundation up to the final touch of painting. The house has a living room, a dining room, a large family room, a study, a kitchen, 1 1/2 baths and an owner's retreat downstairs. It has three bedrooms, 2 baths and a game room upstairs. The house has a total living area of over 3,050 square ft. Located on a woody street near the cul-de-sac, occasionally we saw deer family in our front yard and raccoons, armadillos, and possums in our back yard. The yards are shaded with big oak trees and magnolia trees. With

white columns in the front porch and widows with exterior louver shutters, it is a real southern comfort with modern convenience for our family. Andy's Clear Lake High School was less than 1 mile away. A large area of nature reserve is next to the subdivision across a bayou. The Bay Area Park is also nearby. Grace thought the house and the neighborhood were like a paradise. We budgeted the bi-weekly cleaning lady and lawn maintenance cost into the house price. We have enjoyed and plan to continue our leisure golden years in this house.

Alex finished his Electrical Engineering (EE) degree Summa Cum Laude in only 3 and half years in 1993. He came back home and was looking for a computer engineering job. He interviewed with companies in the Silicon Valley which was the most popular choice for computer engineers. But a misfortune happened in his sophomore year seemed to play a role in his job searching. In that year, he brought an expensive EE calculator to a final examination. After he finished and left his chair to turn in the paper, the EE calculator disappeared. Alex was upset for a while about the loss. He decided to apply for a summer job to make some money for a new calculator. Alex was hired by McDonnell Douglas Aerospace as a summer intern. He impressed his supervisor with his abilities and work ethic. He didn't know that the summer job would eventually lead him to a career at NASA.

During his job search, we did not make any comment or gave him any advice. One day, I was talking to a Human Resources lady in my office about HR businesses of my branch. The HR lady happened to mention that the Robotics, Automation and Simulation Division were looking for a computer engineer. I went home and told Alex about the opportunity. He submitted his resume and application to the HR office the next day. He was invited for an interview. The interviewer coincidentally turned out to be his former supervisor at McDonnell Douglas. The destiny for Alex was with NASA JSC. After reporting to work, he used the tuition money we gave him for the last semester as the down payment for his first new car, a Dodge Stealth.

In the summer of 1993, four of us took a trip to Austria and Switzerland to celebrate Alex's college graduation and Andy's high school graduation. The art and culture traditions of Vienna and the beautiful scenes of Alps were very attractive to us. That was the first of our many tours of Europe later.

Andy seemed to be moody in his high school years. We didn't realize at the time that he was searching for his own identity, i.e. his sexual orientation. We were ignorant about gays. When we found out his struggle, we made some regrettable comments. We were able to reconcile as a family when we accepted Andy as he is. Andy graduated from Clear Lake High in 1993, also with an excellent GPA. He was admitted to the University of Pennsylvania (UPenn), one of the Ivy League colleges. Both of us flew with him to Philadelphia and helped him settle in the dormitory. After coming home, we bought a new 1997 Lexus ES300, for \$36,000 as our family car to celebrate the milestone in our

life - empty nest. The car has run well for 19 years and we still drive it as of today in 2016.

UPenn is an Ivy League school. One year of tuition and fees at UPenn cost more than 4 years at UT Austin. At that time Grace had been working for more than 10 years, we had some savings. We could afford the UPenn tuition as long as Grace continued being employed. Andy also worked on part time jobs during his four years in UPenn to make some spending money. At first, he worked in the school cafeteria where his restaurant experience from high school years helped. The manager was ready to promote him. However, he chose to be a badge-checker for the dormitory, because it allowed him to read books of his classes at work. Andy majored in Psychology at UPenn. We went to UPenn again for Andy's graduation ceremony 4 years later. Even with a degree from an Ivy League school, Andy had problems finding a suitable job. In my opinions, there were too many students graduated with a bachelor degree in Psychology in the United States every year. Many of them went to a medical or a law school. Others went to clinical or research psychology study in graduate school. Andy chose the graduate research path.

Memorable Moments at Work in 1990's

"The purpose of life is to contribute in some way to making things better." - Robert F. Kennedy (1925 - 1968 AD), American Politician

The Space Shuttles had a big payload bay. They were capable of carrying satellites, space structures and exploration probes. After a hiatus of 32-months due to the Challenger disaster, the Space Shuttles resumed operations. One of the most significant payloads post-Challenger was the Hubble Space Telescope. It was launched into a high earth orbit in 1990. After the launch, the astronomical pictures taken by the telescope were blurry. The NASA team determined that the main mirror in the Telescope was incorrectly ground by 0.02 micrometer. For a while, NASA drew serious criticisms for the flaw. A service mission to the telescope was planned to repair the mirror by adding another lens like "spectacles". The service mission had to be performed by astronauts. Only human hands could delicately install the corrective lens into the Telescope. Additionally, the Telescope was in an orbit higher than normal orbits of the previous Shuttle missions. The higher orbit and the long extravehicular activity (EVA) durations of the service mission required careful planning and analyses. The reputation, and possibly the fate of NASA human flights depended on the success of the Hubble service mission. We all knew that every member of the team had to do the job correctly for the second chance. To support NASA's planning of the EVA mission, we carefully checked and double checked the EVA thermal analysis provided by our group. During the EVA repair, the whole team watched the TV broadcast in real time attentively. When the EVA mission was completed, we all felt a great relief. Days later, the NASA Headquarters announced that the repair had corrected the mirror problem, everyone cheered. The service mission demonstrated the "can do" attitude of NASA and proved the indispensability of human

flights in space explorations. Since then, NASA has had 4 more service missions to broaden the capabilities and to extend the life of the Hubble telescope. The Hubble Telescope has been epically the vital research tool for Astronomy. The pictures of the solar system planets, nebulae, and galaxies taken by Hubble were stunning and beautiful. The human knowledge of our universe has been expanded through Hubble well beyond imaginations of most of us. We were all proud to be members of the team that support the Hubble Service missions.

In 1992, a second term co-op joined our Branch. Like other co-ops, Karen Nyberg and I talked about her assignments and her career goals. She indicated that she wanted to be an astronaut. I had heard of other people setting their goals to be an astronaut, but Karen was different from the others. She is very intelligent and determined. She has the personality and charm to be an astronaut. When I saw her jogging in JSC with some astronauts one day, I realized that she was special. How many co-ops had you seen jogging with astronauts? I wanted to help her as much as I could in her endeavors. One of critical qualifications for her to compete for a non-pilot, scientist-astronaut position was an advanced degree, preferably PhD. After she graduated from college, Karen was hired by NASA and assigned to my Branch. I encouraged her to pursue graduate study. She applied and was accepted to the graduate school of UT Austin. She temporarily left our Branch to attend the graduate school. I recommended to her and the UT professor the research topic that would help her the most in pursue of becoming an astronaut. The topic was automatic control of water cooling in a space suit. The topic was highly interested by NASA in development of future spacesuits. With an automatic control, the EVA crewman could focus on his or her missions without having to control the water cooling by hand. The Mechanical Engineering Department at UT has a thermal environmental chamber which was a good laboratory to conduct the research. Karen did the research and completed her dissertation in 4 years. I drove to Austin to sit in her final dissertation examination as a member of the review committee. Karen passed the examination and returned to JSC. She had a PhD degree with a research topic highly relevant to NASA, especially astronauts. I was not surprised that she was selected as an astronaut in 2001. It took seven years for her to be trained for her first mission. In May 2008, Grace and I were invited by Karen to watch the launch of her first space flight from the Kennedy Space Center, STS-124. Although both of us supported the Space Shuttle for many years, it was the first time for us to watch onsite the Shuttle rockets and engines firing off. It was quite an excitable event for us. In May 2013, she flew as a flight engineer for Expedition 36/37 of the International Space Station Program. The Expedition was launched in Soyuz, a Russian spacecraft. Since we could not watch her launch in Russia, we watched it in real time on TV in the Mission Control Center at JSC. She stayed in the Space Station for 6 months. It was my pleasure at work to help younger people in their career development. Among the people I helped, Karen was the one who flew the highest and reached the farthest distant.

While serving as Branch Chief, I also enjoyed working on technical assignments. During the Mid-1990's I participated in a JSC team that was to develop a conceptual design of a habitat for human to travel beyond earth orbits. The team was consisted of specialists in every area of human space flights. I represented the Environmental Control and Life Support Systems area. We took off from our regular jobs and worked together in a conference room in the Gilruth Center of JSC. The team was led by Dr. William Schneider, a senior space structures expert. Under his leadership, we completed the conceptual design of a space inflatable habitat module. Elemental parts of the inflatable module could be launched into space before being assembled and attached to the module structures. The concept allows the size of the module be bigger than the carriers such as the Space Shuttle. The inflatable module conceptual design was completed in a few months. NASA didn't have a program which could apply the concept right away. Dr. Schneider led the team in applying for a patent for the concept. The U. S, Patent 6,231,010 entitled "Advanced Structural and Inflatable Hybrid Spacecraft Module" was granted in 2001. I thought that it would be decades before someone would develop the concept further. I was pleasantly surprised to be notified in 2004 that Bigelow Aerospace intended to develop inflatable modules for a "Space Hotel". Since then they have launched the inflatable module, Bigelow Expandable Activity Module (BEAM) which docked with the Space Station in 2016 to serve as additional living and working space for the crew. The concept has been implemented much earlier and further than our expectations, not to mention the royalties paid by Bigelow.

Friends and Communities

"We make a living by what we get. We make a life by what we give." - Winston Churchill (1874 - 1965 AD), British Statesman, Historian and Author

I had been helped by many friends in my life. Two of them were Bill and Eleanor der Bing. Bill and I met in 1977 in JSC Building 12 Cafeteria where we both went to lunch regularly. One day I was in the waiting line, a stranger approached me and introduced himself as an official in the JSC Public Relations. He and I sat down and lunched together. We talked about our own backgrounds. He then asked me that if I would be willing to serve as an interpreter for a group of Chinese Scientists coming to visit JSC in two weeks. I was intrigued by his offer, since I had never met any scientist from the Communist China before. Would they be vastly different from us in their ways of thinking or in their approaches to technology? I took Bill's offer and met with the Chinese scientists 2 weeks later. Bill and I accompanied them to visit several JSC groups. I found out that there were very few differences between "their" and "our" sciences. I also found out that some of them spoke English as well if not better than I did. We avoided talking about politics so that no feeling was hurt. That was the beginning of our friendship, Bill and me. I met Eleanor not long after my interpreting job. Eleanor worked in the Procurement Office of JSC. Bill and Eleanor were 2nd generation native-born Chinese Americans. They spoke English without accent. They were members of a Toastmasters club in Houston. Toastmasters International is a world-wide non-profit organization developing

public speaking and leadership skills through practices and feedbacks. To help Chinese-born professionals in the Clear Lake area improve their public speaking in English, Bill and Eleanor organized a local Toastmaster club just for us. Both Grace and I were members of the club. Bill and Eleanor not only trained us to speak with confidence and to think on our feet, but also corrected our grammar and pronunciations. I benefited tremendously from my participation in the Toastmasters club. I am grateful to both Bill and Eleanor for their leadership and friendship. Bill passed way in his 90's a few years ago.

I also learned from Bill and Eleanor the essence and pleasures of community services. In 1991, a group of Chinese American professionals in the Clear Lake area organized the Space City Professionals Association (SCiPA). The objectives of SCiPA were to promote understanding and esteem of our common heritage and to promote the spirit of unity and cooperation. The group asked me to serve as the first President of the Association. I accepted the honor. Through the joint efforts of the board members years after years and the leadership of the SCiPA Presidents following my two-year term, SCiPA have contributed significantly to the communities. We held annual Moon Festivals and Lunar New Year Celebration. We sponsored Senior Bus trips 3 to 4 times a year. We held seminars; their topics ranged from health, finance, to arts. We raised funds for disaster reliefs in America, Taiwan and China. One of the many long lasting SCiPA accomplishments was to have successfully promoted Chinese as a foreign language course taught in the high schools of the Clear Creek Independent School District. In recent few years, Grace has been the primary organizer for a lot of SCiPA activities. She has made many friends who helped in her efforts. Her friends are my friends too. Otherwise, why would they make those goodies for Grace to take home after their gatherings? I believe that SCiPA members really enjoyed our activities. I have continued to be the Secretary of SCiPA, keeping records for the Association.

Embracing a New Member of Our Family

"Your family are God's gift to you, as you are to them."

-- Desmond Tutu (1931 -), Anglican Bishop, South African Civil Right Activist, Nobel Peace Prize Laureate

Alex graduated from UT-Austin and took a job at JSC in early 1993. He lived with us in his old room upstairs. We charged him \$500/month which we saved for his future needs. I was not informed of his social life. One day a few years later, he told me that he was in love with a beautiful young lady. What a pleasant surprise it was! We met and instantly liked the young lady, Lisa Kuo. Alex and Lisa were married on Feb. 27, 1999 in the Chapel of the Woodway Campus of the Second Baptist Church, Houston. The reception was held in the Double Tree Hotel Houston Galleria. There were about 300 guests at the reception. Following a Chinese American custom, I was invited to speak for Grace and myself:

Grace and I would like to thank you all for coming to the wedding this afternoon and the reception tonight. We really appreciate your well wishes, generous gifts and most of all your coming here to share our happiness and excitement. I know several couples here tonight have been married for more than 50 years; your presence is especially precious to us. You have brought with you the blessing of your long-lasting marriage and happy family life to share with Lisa and Alex.

Alex is the third generation engineer in our family. Most of you who know him would agree with me that Alex is an honest, good-hearted and reliable young man. We are very proud of him. We also know that Lisa is a kind, happy and sweet young lady. Grace and I are very happy to see them fall in love with each other and to tie the knot today. Lisa, we welcome you to our family with all our hearts and open arms.

Lisa and Alex, you have committed your hearts, minds and endeavors to journey your lives together. We know that you will be proud and inspired in each other's accomplishments, you will feel joys and happiness in each other's companionship, and you will receive nourishments and supports from each other. And most importantly, we know you will keep a profound flow of love and passion continuously in the new family you have just formed. As your parents, we will always be there for you.

*Please join me in wishing them the best one more time.
And let's toast for the Bride and Groom one more time.*

I knew that my English wasn't good for that occasion even after years of the Toastmasters' training of public speech. However, I did speak from the bottom of my heart. Alex and Lisa moved into their own Apartment. One and half years later, they bought and moved into their own house just 15 minutes away from us. Not having a role model to follow, we found our ways to keep good relations with Alex and Lisa. We love them but never excessively involved in their private lives. We respect them as grown adults like close friends. We support each other but maintain our own independence. I believe that we have been quite successful over the years. We have grown closer as years went by.

Andy Moved to California

"Steve Jobs' Three Rules of Life ... 3. Have the courage to follow your heart and intuition - they somehow already know what you truly want to become." - Steve Jobs (1965 -2011 AD), American information technology inventor and entrepreneur

After two years living at home and getting a Master degree from UHCL across the street, Andy was admitted in 2000 to the Graduate School of University of California - Los An-

geles. He was happy to go to UCLA and the sunshine state. Californians were more tolerant of different life styles. We were happy for him to pursue his life dreams. After cashing some US Saving Bonds, we flew with Andy to LA to help him settle in the second largest city of the USA. We bought a brand-new 2001 Toyota Corolla for him. We also bought some inexpensive furniture for his apartment. We thought that if the furniture could last 4 or 5 years till his graduation, Andy could just give them away. We only planned for those furniture to last 5 years until that he could buy better furniture for long term. At the end, the Corolla and the furniture would be used by Andy for 12 years. Before his moving trip, I wrote a few words for him.

*To Our Son, Andy
On the eve of his 25th birthday
From the comfort of your home, you will soon depart,
To pursue your dreams and to live your own life.
If you ever wonder,
“Which star should I follow”?
Just remember,
“A man is his own star, follow thy heart”.
From thousands of miles away, our love will forever follow you.
For the twenty-five years, love is all we have for you.
If you ever wonder,
“What could I do for my parents”?
Just remember,
To send us earnest messages,
That you are happy, healthy, and in control of your own destiny.*

As we now call Houston our hometown, California is where Andy finds solace in his heart.

Disaster and Sorrowfulness in Early 2003

“Mankind is led into the darkness beyond our world by the inspiration of discovery and the longing to understand. Our journey into space will go on.” President George W. Bush (1946 - AD) 43rd President of the United States of America, in his speech after Shuttle Columbia disaster

On Saturday February 1, 2003, I was at home watching a non-news program on TV. About 9:15 AM, one of our neighbors, Shinyee Lee came into our house and told us that Space Shuttle Columbia just disintegrated during its re-entry. I could not believe that we had another Shuttle disaster. Using my fumbling hand to switch to a news channel on

TV, the unbelievable shocking news was being broadcasted on all channels. I immediately left for my office. When I arrived at the office, an order from the Center Director was just passed down that all files related to the Shuttle program were to be locked down for the pending investigations. I locked down the Shuttle –related files in our Branch as ordered, but my thoughts were on the 7 lost astronauts. Columbia disintegrated because its left wing was breached by the hot plasma created during re-entry. But the original cause of the tragedy took place during its launch. As Columbia soaring into sky, a piece of insulation foam on its bipod ramp broke off and hit the most vulnerable part of the Shuttle, the heat resistant tiles on the front edge of the wing. The bipod ramp was the structure connecting the Shuttle fuel tank to the Shuttle. Before the launch, the fuel tanks were filled with liquid oxygen and hydrogen at extremely cold temperatures. The bipod ramp experienced a steep temperature drop during the fueling. The cold metal contraction of the bipod ramp probably loosened up the insulation foam on the ramp. A piece of the loose insulation foam fell off due to the shakings and vibration during first few seconds the launch. One (or more) of the heat resistance tiles was cracked by the impact of the insulation foam. After reviewing the launch video, NASA was aware of that the heat resistance tile(s) had been hit by the falling insulation foam. But there was no way at the time to inspect the tiles until the Shuttle landed. Neither were there capabilities or materials to repair the tiles during the flight. Therefore, the Shuttle Program management team decided to proceed with mission and the Shuttle re-entry as planned. I believed that their decisions were based on their best knowledge and our limited capabilities

I came home with a heavy heart after locking down the Space Shuttle related files in my Branch. However, Grace had more sad news waiting for me. Her mother just passed away. After being informed of the bad news, Grace booked a flight and went back as soon as she could. My mother-in-law had suffered Alzheimer's syndromes for several years before that sad date. She had been bed-ridden unconsciously the last two years of her life. Grace went back to visit her almost every six months during her long illness. Due to the good cares provided by Grace's elder brothers and sisters-in-law, her mother stayed in her own home during her illness till the last day. Her doctors had told the family that medicines could not reverse her conditions. The best treatment was to provide her with medications and cares to make her more comfortable.

I had to stay in Houston to support the Columbia disaster investigation. The post-accident investigations included how could the metal contraction during the tank fueling cause the foam to loosen up and how the broken heat resistant tiles could lead the destruction of the Shuttle wing. Dr. Gene Unger of my Branch provided a detailed analysis regarding the metal contraction leading to the insulation foam break-off. Dr. Harry Chang (張元樵) of the Structures Division performed the analysis regarding the heat-resistance tiles breach leading to the destruction of the Shuttle wing. I knew both analysts. I had reviewed Dr. Unger's analysis in first hand. I had heard only comments indirectly about Dr. Chang's analysis. Both analyses exemplified efficiency, honesty and integrity.

NASA had learned many lessons from the Columbia disaster. They had made changes in how to install insulation foam better and in making flight management decisions with more inputs from technical experts. The difficult bed-ridden experience of Grace's mother in the last 2 years of her life taught us a valuable lesson, too. We needed to prepare living wills and instructions for our final medical care in writings. We have kept those documents updated to avoid burdening our next of kin with difficult situations.

2003 - The Year of Turning Around

"Grandchildren complete life's cycle of love"

In the early part of 2003 after the disaster of Shuttle Columbia and passing of Grace's mother, the time could not be any sadder for us. In late March 2003, Grace and I took a trip together back to Taiwan to visit our families. We stopped over in Japan for a few days. It was the "Cherry Blossoms" season in Japan. We saw hundreds of trees blooming with countless flowers *en masse*. The blossoms were exquisite and graceful. Japanese people we met were courteous, pleasant and neat. I wondered why in the first half of the 20th century, the cruel and violent militarism could rise in this beautiful land. The militarism led Japan into aggressions against neighbor countries and eventually to the World War II that killed tens of millions. I like the land and the people of Japan, but could never forget the destructions and sufferings caused by the Japanese Army.

After we arrived in Taiwan, we went to visit the resting places of our parents immediately. We brought good news with us. Alex and Lisa were going to have a baby, expected in late November to early December. After we returned to the United States, I wrote down my thoughts of being a father in a few paragraphs to Alex.

To Alex on the Day He Becomes a Father

Life is full of cycles. Today, you have completed one of the most wonderful cycles in life and entering a new cycle. You are not only a son but also a father. What an amazing experience!

Fatherhood comes with immense responsibilities but also brings endless joys. You will help, just like I did, your son grow up. Someday, he will be bigger and stronger than his father is, just like you are. You will teach Ryan love, trust and hope, some of them you learned from your father. Someday he will develop, just like you did, into a loving, trustworthy and caring young man. For many times, you will have to change Ryan's diaper, but for more occasions you will enjoy his smiles and laughter. In many nights Ryan's crying will wake you up, but in more nights, you will fall asleep with a warm thought knowing he is safe and sound. Ryan will need you to soothe him when he is sick injured or set back. Ryan will also want you to share his triumphs, successes and awards. I was so happy and proud of you when you spoke your first word, walked your first step,

went to your first class, scored your first soccer goal, received your first award, won your first trophy, graduated from college and married the woman you love. Someday, Ryan will bring the same joys and prides to you.

Life is a journey. Now you and Lisa have a little chap who will follow you everywhere and learn from everything you do. As a father, you must be strong like a tall mountain but calm like a quiet stream. Be firm and resolute when facing difficulty or adversary and don't let emotion overrun your judgments. You must be warm like the midday sun and comfy like serene night to him. Show Ryan your love and affection, but leave him room to grow on himself. You must have the power of a warrior and the wisdom of a sage. Being a father to a child means you can take on any task, but a man should know his limits. You must have a heart of enormity and patience of eternity. Understanding and forgiveness are essential for a happy family. You can handle these challenges and you will be a good father, because you are a good son. Lisa and you will be together guiding Ryan through each step on his way, as your mom and I tried not to miss any of your steps. When Ryan is ready to go on his own way, you will have accomplished the most important achievement in your life.

Son, watching you growing up and becoming a father has filled my heart with joys. As I will be watching your family journeying forward together, my endless joys continue and multiply. You, Lisa, and Ryan will always be in my heart and will be a joyful part of my life forever.

On December 2, Ryan Alexander Lin was born. I just could not describe our joys in words, neither English nor Chinese. What a year of turning around 2003 was!

Optimism and Worry

"I expect him to be all right." - Michael DeBakey (1908-2008 AD), World-renowned American cardiac surgeon, innovator, scientist, Chancellor of Baylor Medical School in Houston

Not long after Ryan was born, a shadow of worrying permeated into my mind. The pediatrician examined Ryan had diagnosed a congenital defect in his heart. An open-heart operation was needed to repair the defect. The doctor advised Alex and Lisa to wait for six months until the baby grew stronger. In the meantime, they should keep the baby free of respiratory infections such as a cold or flu. All people who came into contact with Ryan needed to have a flu shot so they would not transmit virus to Ryan. Grace and I went to the clinic to get the vaccine for flu. That was the first and only time Grace ever had a flu shot. She has been healthy and seemed to be immune of flu and cold. For Ryan, she was willing to take the shot.

During the 6 months wait for Ryan's operation, worry wandered into and out of my mind. Most of the time, I kept myself optimistic. Because I knew that we had the best heart surgeons here in Houston. The Texas Children's is one of the best hospitals in the world. Ryan would be well taken care of and come out a healthy baby.

The six months of waiting were over. Ryan was in the Texas Children's Hospital for surgery. Alex, Lisa, Lisa's parents, Grace and I held our hands together in the waiting room. A pastor from Alex and Lisa's Church came and said a prayer for Ryan. My anxiety meter (if there was such a thing) during the waiting time for the surgery to be completed probably hit all time high in my life. Finally, the surgeon came out and told us that the surgery went well. The doctor's words were the most soothing music for me. Grandparents were not allowed into the patient room after the surgery. We could only look at him 20-feet away. When I saw Ryan with a chest full of surgery stitches, I wished that it was me in there. A few days later, Ryan was discharged from the hospital and went home for a total recovery. We are so grateful to the surgeon and to the hospital teams. Thirteen years later, Ryan is a healthy, active and intelligent young man with high potentials ahead.

Organizational and Technological Challenges

"NASA technology development also supports the nation's innovation economy by creating solutions that generate tangible benefits for life on earth." - NASA Website, Technology exploration

One characteristics of a good manager was to develop talents with a succession plan in mind. When the Division assigned Harold Reimers as Deputy Chief of my Branch, he fit in my succession plan perfectly. I recognized his dispositions for a good manager. He is smart, sincere and hard-working. However, Harold did not stay in my succession plan for long. He was promoted with my high recommendations to be Chief of another Branch. My plan went back to square 1. The Division then assigned Marie Kowal as my Deputy. Marie came from the Thermal Branch of the Structures Division. She is well-versed in thermal analysis. What she needed was hand-on experience in personnel management. I had no doubt that she could pick up that experience quickly once opportunities were presented. I asked Marie to sit in almost all my meetings with Branch personnel. She learned the personnel management skills quickly.

With helps from Harold and later Marie in carrying out supervisory duties, I had time to take part in three "envelop pushing" technology projects that were monitored by our Branch. The GLACIER is an experimental freezer for the Space Station. The freezer was developed by University of Alabama, Birmingham (UAB). The ultra-cold freezer is needed for preserving samples of certain life sciences experiments at temperatures as low as -160 °C (-301 °F). The low temperature capability was required for. The commercially available freezers at that time normally had a low freezer temperature around -

90 °C. To push the low temperature down another 70 °C, the freezer required a super refrigeration cycle and super insulations. The scientists at UAB were successful in meeting both design requirements. The GLACIER was launched in STS-126 on Nov. 15, 2008.

The second technology project was the development of a solar powered refrigerator/freezer. The objectives of technology development are to preserve cooling without uninterrupted power from an electricity grid. The refrigerator/freezer had to have super-insulation. The stand-alone system could provide a mean to preserve food for people living far away from electricity. The project engineer in our Branch was granted a USA patent for the design. We developed the technology for future manned Lunar or Martian base. Those exploration programs may be many decades away. But the refrigerator/freezer could have terrestrial applications before that.

The Softgoods Lab in our Branch designed and fabricated thermal insulation for the Alpha Magnetic Spectrometer (AMS-02), a particle physics experiment that was designed to measure antimatter in cosmic rays and to search evidence of dark matter. It was launched in May 2011 by the Space Shuttle and was mounted on the Space Station. It is still collecting data today and will be for several more years to come. AMS-02 has involved scientists in 16 countries. The Principal Investigator of AMS is Professor Samuel Ting, a Nobel Laureate.

Changes took place at the top of our Division began in 2000. Wil Ellis retired in 2000. Other colleagues of the same generation also retired in the following few years. Most of them started their careers with NASA when they were young and fresh out of colleges. They retired when they had 40-years of services. I didn't start as a federal employee until I was 37. I felt I still could be productive when my contemporaries retired. I wanted to continue working for NASA. But gradually, my body was sending me different messages. The first message was insomnia. Inability to fall into sleep or to sleep well through the night happened frequently. The problem was aggravated by dealing with a personnel problem at work.

We had a non-productive employee in our Branch. He had been in our Division for more than 15 years. He was passed around from one Branch to another, because he was unproductive in all his jobs. When given an assignment to carry out by himself, he would always miss a milestone or the deadline. If given an assignment to work with a coworker, we would not do his part. He was just happy to get a pay check without making any contribution. Sometimes, he did not even bother to show up in the office or stay at his desk. He was a headache for his boss and a morale depressor for the organization. None of his previous supervisors wanted to deal with the problem of disciplining him because of the concerns regarding the Federal Equal Opportunity laws. When he was passed on to my Branch, I realized that there were three options. The first option was to change his attitude with some successful small steps. I gave him a non-critical assignment with no hard deadline. If he was successful, I would have given him more important assignments. He

took the no-deadline assignment and did nothing. When I checked his progress on the job, he said that he was working on it. After making several evasive progress reports and excuses, he flatly told me that the assignment was too trivial for him. I gave him another assignment with a deadline but I moved up the deadline. The time that I allowed him to complete the work was still plenty. The deadline move-up was just a reserve for me to rescue the assignment. As anticipated, he did nothing and I had to use the reserve time to rescue the assignment. It was like a quotation that I learned from a management class, “If you expect it to fail, it will fail.” By then I was fed up and decided to exercise my second option. I gave him an “improvements needed” for his annual job evaluation as a shock treatment. The evaluation was an understatement of the drastic changes needed for his work productivity. But it was the worst he ever got. He immediately appealed that evaluation to my boss who backed me up. He then appealed to the Human Resources. The Human Resources came over and we discussed the relevant regulations. By the book, to give an “improvements needed” evaluation, a supervisor had to prepare a job improvement plan with detailed descriptions of products and due dates. I did just that. Soon I realized that if he failed to meet the improvement plan, I would have to give him an “unsatisfactory” grade next. Had I given him an “unsatisfactory”, I needed to be ready for an equal opportunity lawsuit. I really didn’t want to go there for NASA or myself personally. So, I took the third option. The third option was to transfer him out of my Branch like his former supervisors did. A transfer within the Division was implausible since every Branch in the Division had been unsuccessful with him. Fortunately, I had made a few supervisor friends outside of our Division. One of my friends agreed to take the problem employee on a temporary one-year “rotational” assignment. That meant the supervisor could return the employee if the temporary assignment did not work out. If he was returned, then what? Thinking about these issues kept me up some nights.

The second message that my body sent me was hearing loss. My job required me to attend or to chair meetings. I found out that I gradually had problems catching every word said in the meetings. I felt embarrassed by my declining hearing ability. I discussed the problem with my boss, the Division Chief. She offered me a lateral transfer to a non-supervisory position so I would not have to go to or chair meetings. After thinking over her offer, I decided to retire. I would rather retire than not perform at 100% on my job.

Coping with Hurricanes

“A friend in need is a friend indeed.” - Old proverb

2005 was the most active Atlantic hurricane year in American history. In August, Hurricane Katrina caused tremendous damages in human deaths and destructions of properties in the New Orleans area. Hundreds of thousands had to be evacuated from the area during the Hurricane, many of them to Houston. The disastrous images were fresh in our minds when another intensive hurricane, Rita was aiming at Galveston and Houston in late September 2005. We all took the lessons learned from Katrina very seriously, especially for us living near the coast. We decided to evacuate from our house ahead of the

official storm warning. We wondered where we should go. Fortunately, a friend in northwest Houston invited us to stay in their house until the threat was over. We took off immediately and left before the mass evacuation of the coastal area. It was a relief that we had a safe place to go. We truly appreciated the hospitality of the Ping Lee (周平) and her husband. The evacuation of the Houston metropolitan area was not well planned. The evacuation was a calamity by itself. Many people living 50 miles away from the coast were scared and evacuated unnecessarily. The north and west bound highways from Houston were totally congested with cars, trucks and buses. Many of the vehicles overheated and stalled. Several nursing home residents died in their evacuation bus when it broken down. The hurricane took a sharp right turn before landing and hit the Beaumont area 70 miles east of us. That was close.

Three years later, hurricane Ike was coming our way. The governments called for evacuation again. This time it was better planned. People evacuated in an orderly way according to their vicinity to the coast. We had time to reserve a motel room in northwest Houston. We stayed in the motel for two nights. Ike hit the Houston area hard and caused widespread loss of electricity service. After Ike left, we were asked by the motel manager to leave because the motel had lost electricity. We came home to an undamaged house, but without electricity. Fortunately, a NASA colleague living 4 blocks away had bought a generator run on gasoline before Hurricane Ike. He was kind to loan us the new generator since his house had electricity. The generator had enough power to support the refrigerator, computer, lights and a fan, but not the air conditioning. The electricity service in our house was not restored for 11 days. We were literally getting hot and bothered. A friend suggested that we took a cruise from Galveston to escape the heat. We booked a 4-days Carnival cruise ship out to Cozumel Mexico at the last minutes for a very low price. We didn't mind where the destiny of the cruise was. We just wanted air conditioning in September and fresh foods!

Two Great News Prior to Retirement

"It is not what you do for your children, but what you taught them to do for themselves that will make them successful human beings." - Advice Column "Ann Landers"

Since Alex joined NASA JSC in 1993, he has advanced from GS-7 to 13 steadily, spending almost minimal time required on each grade. In early 2007, Grace and I were pleasantly surprised when he told us he was promoted to GS-14. That was a major breakthrough, especially at his age of 36. Two thirds of JSC employees never made to GS-14 in their whole career. Walter Guy had been his Division Chief since Alex was hired by the Robotics, Automation and Simulation Division. Alex was promoted by Walter to GS-14. Walt was my Branch Chief when I was hired. He was my Division (Crew and Thermal) Chief, when I was promoted to GS-14 in 1986. What a coincidence! After my pending retirement was known to managers in the Engineering Directorate of JSC, Walt stopped by my office to chat with me. We reminisced of the time when we worked together. He had very kind and nice remarks about my career. I thanked him for hiring

me that started my career at NASA. When he was about to leave, suddenly he commented about Alex “Your boy has excellent talents and computer skills. He was a little shy at the beginning, but we trained him. He is alright.”

The second great news was that on July 16, 2007, Lisa gave birth of a beautiful baby girl; Margaret Catherine Lin. Here was how I wrote to her

*Welcome Margaret Catherine “Maggie”
Your eyes are more lustrous
than black pearls from the south sea.
Your checks are more vibrant
than spring blossoms of a cherry tree.
Your face is cute and your heart pure.
Our love for you will forever endure.
You’re a blessing from God that we always cherish.
Our joy is endless to watch you shine and flourish.
Grandpa and Grandma*

Retirement Ceremony

“The reward of a thing well done is to have done it.” — Ralph Waldo Emerson (1803 - 1882 AD), American lecturer, Poet and Essayist

On August 3, 2007, we gathered in the Auditorium of Building 7 to celebrate the beginning of the next phase in my life. The Crew and Thermal Division located in Building had been the home of my career for 27 plus years. I had enjoyed a lot of happy days and shared many exciting moments of successes with my friends there. We had endured and overcome trying times of tragedies together. The Auditorium was full of people. Grace, Alex, Lisa, Ryan and the 17-day young baby Maggie attended. Lisa’s mother, Irma Kuo came from the west side of Houston with a gift. My boss, Division Chief Patricia Petite presided over the ceremony. Dr. Ungar spoke for the people in my Branch. Astronaut Karen Nyberg represented the office of Astronauts that gave me a Silver Snoopy Award for contributions to the safety of crew. The Engineering Director awarded me an Engineering Legacy Plaque. The Director of Johnson Space Center, Michael Coats presented me the official NASA Retirement Plaque. Many people came up to say very nice things about the time we worked together; a few of them were in tears. Many coworkers signed on a picture showing the Space Shuttle blasting off. All these plaques, awards and pictures decorated the walls of my study at home. Also on the walls are the two Exceptional Service Medals awarded by NASA in 1993 and 2000. These two medals highlighted my services to NASA, and are the most cherished awards for my career. It was a day of honors and joys mixed with slight sadness.

Life after Retirement

“Who knows whether in retirement I shall be tempted to the last infirmity of mundane minds, which is to write a book.” - Geoffrey Fisher (1887 - 1972 AD), Archbishop of Canterbury

The pace of retirement life was much slower than I was used to. Not having to rush to office 7:30 in the morning started the day in a relaxed way. On the other side, I didn't know at first what to do with all the free time. My retirement life needed more animation. Fortunately, Grace and I joined a Chinese-American association in Houston for a tour of Chile and Argentina in November 2007. The tour began with a tour of Santiago, the capital city of Chile. That was the first time that I set foot in the Southern Hemisphere. The next day, we took a flight to Punta Arenas, Chile. We boarded a small cruise ship, “Crucero Australis”. The ship has a passenger capacity of around 500. That's small comparing to ships with passengers in thousands that we cruised in later years. From Punta Arenas, Australis navigated through the Strait of Magellan to Cape Horn, the southernmost headland of Americas. We took an inflatable boat to Homos Island and walked up to the Cape Horn Memorial that was dedicated to thousands of sailors who lost their lives sailing around the tip of South America. Sailing through the narrow passage of either Strait of Magellan, Beagle Channel or circumnavigating Cape Horn was a perilous route connecting the Atlantic Ocean to the Pacific Ocean before the opening of Panama Canal. Walking on the Island in the gusty winds, we felt like we could be blown off the Island anytime. In front of the albatross shape monument, I admired the explorers' valiant spirit centuries ago. They were forerunners of the space explorers today. The inflatable boat then took us to another island. We walked on the beach where a bull elephant seal watched us invading its territory. We also caught a few glimpses of wild penguins on another island where we could not land due to high waves. The weather of the area near Antarctic could change so rapidly that all 4 seasons could be experienced in just one day. Australis also took us to the Moreno Glacier in Argentina. We saw and heard ice chunks breaking off the Glacier. The cruise was really an exploration. It was the most impressive cruise for me. Since then, we have taken a vacation tour or cruise every year, more after Grace retired in 2011. We had been Europe numerous times. There were three ocean cruises in the West Mediterranean, the East Mediterranean and the Baltic Sea. There were two river cruises of Rhine and Danube. We had land-tours in the United Kingdom, Italy and France. Travels have been an important part of my retirement life. We love the beautiful landscape, magnificent architectures, nice people and rich cultures in Europe. Nevertheless, after every trip, the sight of our home in Houston has always been the most beautiful and welcome.

Each of our trips usually took a week to 10 days. For the rest of the years, we have different hobbies to spend our time. In 2008, Grace picked up painting as a hobby. She really put a lot of time and efforts into painting. She took group lessons from Mr. Dao Truong's Chinese Painting Class (黃啟濤老師國畫班) on every other Saturdays for 5 years until Mr. Truong retired in 2013. Grace learned painting flowers, birds, and insects in

Chinese Ling-Nan-style from Mr. Truong. Her painting style was a combination of traditional Chinese and western water colors. Grace learned quickly and made great strides in painting skills. She has formed two painting clubs to share her painting skills and joys with friends. Grace is a member of the Clear Lake Chinese Chorus. The Chorus participated in many concerts organized by Chinese communities in Houston. Grace was also a constant member in the stamping club organized by Lisa. She incorporates painting and stamping into making greeting cards. Her cards were highly welcome by friends. Recently she picked up another hobby in knitting. Her days are full of activities.

As for myself, I like to read books and articles online. Besides reading I like the card game of bridge. Starting in 2013, I play in the Clear Lake Bridge Club regularly twice every week, usually with J. H. Chuan (全任洪) as partner. Bridge is a brain sport, being played internationally in many countries. Bridge has been proposed as a competition game in Olympics. Hopefully playing bridge will keep my mind sharp. I walk every morning for 2.5 miles in our neighborhood. Thinking while walking helps me plan for the day ahead. I remembered that my father walked every day in his retirement, we have the same trait.

Grace (old friends still call her Jen-Ching), and I enjoy different hobbies. We have very different personalities and interests. But we have same values and perspectives on important issues. We have worked well together as a team throughout our lives. We support and complement each other. We recognize the strengths and understand the shortcomings of each other.

Another part of my retirement life has been community services. The Space City Professionals Association has sponsored many programs for the Asian-American community in the Clear Lake area. For the past decade, Grace has been a major organizer of the programs such as Moon Festival, New Year Celebration and Senior Bus field trips to parks, gardens, wildlife zoos and festivals. Whenever, wherever she in charge of a program, she could always count on me to help and accompany her. I have been the secretary for the association for the past 25 years, keeping board meeting minutes and 501(c) related documents.

The third and the most enjoyable part of the retirement life has been my family. I enjoyed every occasion when we were with our children and grandchildren. Alex and Lisa have a happy family. As a full-time mother since Ryan was born, Lisa has raised her children very well. They are well-behaved and well-adjusted kids. They also excel academically. Both Ryan and Maggie are in the gifted and talented programs. We are proud of them. Alex utilizes his expertise in Robotics and computers to coach the robotics team in the Westbrook Intermediate School, of which Ryan is a team member. The team won the championship of the School District and went to Dallas to participate in the state-wide competition. Alex also coaches the robotics team in the North Pointe Elementary where Maggie is a 4th grader. The team won the Texas Championship in 2016.

Andy lives in West Hollywood, California. We have family reunion every year in the holidays between Christmas and New Year's Day. Andy always came to the reunions and we had good time. In 2012, we bought a pretty nice, 850 square feet, one bed room condominium unit in West Hollywood for Andy to live in. The timing couldn't be any better as Andy got the dream job he wanted. He joined the Statistical Analysis Group at UCLA. We took a trip to LA to inspect the condo unit which we bought at the low point of the housing market crash after the 2008 depression for \$305,000. Not long after that Andy met Michael Simpson. Michael moved in with Andy and found a job in LA with Aryzta, an international special food business. We met Michael when he came to Houston to join our celebration of Grace's birthday in 2015. He is a nice fellow and we like him. We had a grand family reunion at the end of 2015. All eight of us joined a 4-day Disney cruise from Galveston, TX to Cozumel, Mexico. We all had great time, especially the kids.

Both Andy and Michael have advanced on their professional career. Andy is now the lab manager of the Statistical Analysis Group at UCLA. Michael is the Director of Talent Acquisition, Aryzta North America. They were married on May 29, 2016 in LA. The whole family and some of Andy's cousins attended the wedding. We are very happy that Andy found a good person to form his own family and they will look after each other. Grace and I celebrated our 50th wedding anniversary on July 10, 2016, with our family in a cruise from Vancouver, Canada to Anchorage, Alaska. We also took a land tour after the cruise. The sceneries of Alaska are majestic and beautiful in summer.

Epilogue

From a baby born in a seaside village escaping the ravage of World War II to a retiree living comfortably in a beautiful suburb, my life has been mostly pleasant and enjoyable. My parents loved, nurtured and protected me from the destructions of the wars. They taught me right values and ethics that molded my personality. My sister and brother helped me in my childhood and adolescent years. I met the love of my life, and she married me. She loves me and has been my best friend and soul mate. We shared the responsibilities of establishing and supporting our family seamlessly. She encouraged and advised me whenever I was uncertain, especially at the critical junctures of my career. Together, we raised two good sons who have their own good careers, happy lives and families. The two precious grandchildren give immense joys in our golden years.

I was taught by many outstanding teachers in my school years. I am eternally grateful to Rice University for offering me a full scholarship. The scholarship enabled me to come to this land of opportunities. The graduate school education at Rice trained my skills to start a career in the space program. NASA recognized and appreciated my skills and

abilities at work. The culture of NASA allowed me to contribute my ideas and opinions with integrity and honesty. My career in NASA was beyond any imagination or dream that I ever had before I took my first job at JSC. I am truly grateful to this greatest country in the world. The United State of America not only has given me liberty but also allowed me to pursue happiness. I have done my best to be a loyal, law-abiding and productive citizen of the country that adopted me.

Whenever I look at the glittering stars in the sky, they seem to call on us to reach them. I was fortunate and honored to have made small contributions to the Space Program. Many friends helped me out in my career as well as in my life. I knew that I could not directly repay them individually. In turn, I have helped and made positive impacts on the careers and lives of other people. Hopefully the baton will be passed on and on.

President Lincoln said, “It is just the life in your years that count.” I hope that my life would be counted positively some time in future. Or perhaps, my life can be likened to a wild goose’s footprint on snow. The claw’s imprint is accidentally left. But carefree, the bird flies to east and west like the poet Su Tungpo.

July 10, 2017

The Journey Ends

August 29, 2018. Today was to be a happy day, the day we brought you home from the hospital after successful heart bypass surgery. I made plans to visit you every day to help you heal and strengthen your heart. You were to continue your journey, visiting national parks, playing bridge, and watching your grandchildren grow. Everything was to return to normal. But everything did not. Today is a sad day, our journey together ended two days ago. Today we must continue our journey without you, our guide, our mentor, our support, our protector, our colleague, our friend, our uncle, our husband, our father and grandfather. And Dad... we can do it. We are ready because we were prepared and supported by you. We are confident because we listened and learned from you. And although our hearts hurt today we are going to get better, because we are strong like you. –Alex