and honors. In 1962, only three years after receiving his doctorate and joining the faculty at UC Berkeley, Tien received the university's Distinguished Teaching Award, becoming the youngest professor to do so at age 26. In 1976, Tien joined the National Academy of Engineering, which awarded him its highest prize in 2001. In 1997, Tien became the first recipient of the UC Berkeley Presidential Medal. UC Berkeley's Chang-Lin Tien Center for East Asian Studies, the asteroid Tienchanglin, and the Chevron oil tanker Chang-Lin Tien are all named in his honor.

In 2000, Tien was diagnosed with a brain tumor. Shortly afterward, he suffered a stroke from which he never fully recovered. Just two years after his diagnosis, Tien died at the age of 67. He was survived by his wife, Di-Hwa, three children, and four grandchildren. His son Norman Tien is the dean of Case Western Reserve University's Case School of Engineering. His daughters Phyllis and Christine Tien are, respectively, a physician at the University of California, San Francisco, and a senior program officer at The California Endowment, a philanthropic health foundation.

Winston Chou

See also Chinese Americans

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Ting, Samuel Chao Chung (1936–)

Samuel C. C. Ting is a prominent Chinese American physicist best known for his experimental discoveries in the field of high energy physics, including that of the J/ψ particle for which he shared the Nobel Prize in Physics for 1974. He has also been active in promoting U.S.-China scientific exchange.

Samuel Chao Chung Ting (Ding Zhaozhong in *pinyin*) was born on January 27, 1936, in Ann Arbor to father Ding Guanhai and mother Wang Junying, two Chinese students who had just received their MAs at the University of Michigan. At the time, Ting's father, a civil engineer, had already returned to China to take up a professorship at the Jiazuo Institute of Technology in Jiaozuo. His mother, an educational psychologist, followed suit with Ting in tow in April of that year. In the next few years, Ting became a young refugee as the family fled the Japanese invasion, eventually to Chongqing, the wartime Chinese capital in southwest China, where Ting's father and mother both found jobs as college professors. Following the Japanese defeat in 1945, they moved to Nanjing after a short detour in Qingdao by Ting and his father. In 1949 the Nationalists lost the civil war to the Communists and Ting moved again with his family to Taiwan, where in 1955 Ting enrolled at Tainan Institute of Technology in Tainan.

In 1956, Ting transferred to the school of engineering at his parents' alma mater at Ann Arbor but switched to physics in 1957. His passion for the new field was soon bolstered even further by the exciting news of Chinese American physicists Chen Ning Yang and Tsung Dao Lee's winning the Nobel Prize in Physics later that year. From Michigan he earned bachelors of science and engineering in physics and in mathematics in 1959, a master's degree in 1960, and a PhD in 1962 in experimental physics.

Choosing challenge over stability, Ting turned down an offer of assistant professorship at the University of Rochester and instead went to the Nevis Laboratory at Columbia University as a research associate in 1962 where he had opportunities to work with the well-known Chinese American experimental physicist Chien Shiung Wu before moving soon to CERN, the European center for nuclear research in Geneva. There Ting worked with Giuseppe Cocconi, an Italian physicist, conducting experiments on a proton synchrotron. In 1965, Ting returned to Columbia as an instructor in physics, promoted to assistant professor a year later.

In 1966, Ting made his first mark in the world of physics: leading an international group at the Deutsches Elektronen-Synchrotron (DESY) in Hamburg, Germany, Ting conducted an experiment that helped establish the validity of quantum electrodynamics (QED), a foundational theory of modern physics, against several earlier purported experimental

challenges. The QED experiment brought Ting international fame in physics as well as an associated professorship at the Massachusetts Institute of Technology in 1967, followed two years later with a full professorship.

In the late 1960s and early 1970s, Ting worked on high energy particles of light, or photons. When photons reached a high energy, they sometimes, as a fascinating physical phenomenon, turned into other particles called vector mesons that actually have masses several times that of protons. Because these mesons shared most other qualities with the photons except their masses, Ting called them "heavy photons." At the time, there were three known heavy photons: the "rho," "phi," and "omega." Theorists believed that these particles, which were very short lived, were, like protons and neutrons, made up of more fundamental particles called "quarks." The prevailing theories assumed that there were three kinds ("flavors") of quarks and their antiparticles (antiparticles are the same particles with opposite charges)—"up," "down," and "strange"—and they made up the heavy photons: up-antiup (rho), down-antidown (phi), strange-antistrange (omega). Ting, however, followed his intuition and believed that more heavy photons might exist and require a revision of the existing quark theory.

In 1972, Ting led a team of collaborators to conduct a difficult experiment at Brookhaven National Laboratory in Long Island to detect new heavy photons, likening it to "looking for a particular pair of raindrops on a rainy day in Boston." All the hard and meticulous work by Ting and his team paid off in September 1974 when analysis of the experimental data indicated the appearance of a new particle at the energy level of 3.1 GeV (giga or billion electron volts). It was a sensational discovery but Ting decided to postpone publication for rechecking and for investigating the possibility of the discovery of a second particle. Finally, news that another team of physicists at the Stanford Linear Accelerator Center (SLAC), with collaborators from the University of California, Berkeley, and headed by Burton Richter of SLAC, made an apparently independent discovery of the same particle pushed Ting into making the announcement.

The almost simultaneous discoveries naturally provoked controversies about priority claims. The Nobel committee settled the matter, to some degree, with its awarding the Nobel Prize in Physics for 1976 to both Ting and Richter. (Ting made his Nobel acceptance speech first in Chinese and then in English.) The new particle was named "J" by Ting, "ψ" by Richter's team, and later officially "J/ψ" by the physics community. Soon it became clear that "J/ψ" revealed the existence of a fourth quark, "charm," which had been predicted by the Harvard theoretical physicist Sheldon Glashow. Glashow explained the "J/ψ" as a meson made up of a charm and an anticharm, thus completing the November Revolution in physics that eventually helped unify electromagnetic and weak interactions, two of the four fundamental forces in nature (the other two are strong and gravitational forces).

The hard-driving Ting continued to be a major force in experimental high energy physics following the J/ψ discovery, leading international experimental groups, often with participation by scientists from China, at DESY, CERN, and elsewhere. In the late 1990s, Ting led the international effort to construct the so-called Alpha Magnetic Spectrometer (AMS) to detect dark matter and antimatter in space. The AMS was flown and tested in space shuttle Discovery in 1998 and a newer version of it was to be put on the International Space Station in 2009 or 2010.

Ever since his first trip back to China in 1975, Ting has made frequent visits there, involving a large number of Chinese scientists in international scientific collaborations, and otherwise promoting science and education in mainland China, Taiwan, and Hong Kong.

Zuoyue Wang

See also Chinese Americans

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Tokyo Rose

Tokyo Rose was a moniker used to describe nearly a dozen female radio personalities working for Radio Tokyo in Japan during World War II. Although Tokyo Rose was actually many different women, the name became a near mythic phenomenon among American soldiers serving in the Pacific who claimed that she tried to demoralize them with stories of Allied defeats, taunts, American music, and tales that made them long for home. Many American servicemen reported that these efforts often had the opposite effect of lifting their spirits. Still others claimed that Tokyo Rose possessed detailed information about the American military's movements in the Pacific Theater. Regardless of the fact that no one person could lay claim to the title of Tokyo Rose, the name is most commonly associated with Iva Ikuko Toguri D'Aquino, a Japanese American citizen who broadcasted for the Radio Tokyo program "Zero Hour" and who was later convicted of treason by a U.S. court for her association with this organization. Although the court convicted her under questionable circumstances, she has, however, erroneously been branded as the face of the Tokyo Rose persona.

D'Aquino's path to infamy was a convoluted one, which began in the United States. She was born Ikuko Toguri in Los Angeles on July 4, 1916, but used the name Iva. Her father, who was a merchant who owned a small business, raised his daughter as an American and did not teach her the Japanese language. After graduating from the University of California, Los Angeles in 1941, she hoped to pursue a medical degree. However, she left for Japan that year without a passport to either study medicine or care for a sick relative. She possessed a letter verifying her citizenship and planned on acquiring the necessary return

Correspondents interview Tokyo Rose (Iva Ikuko Toguri D'Aquino) in September, 1945. (National Archives)

documents at the American consulate in Japan. Those arrangements would not be completed, as later that year the Japanese attacked Pearl Harbor. She elected to remain in the country but refused to renounce her citizenship, despite being labeled by the Japanese government as an "enemy alien."

In the following years, Toguri worked as a typist for the Domei News Agency and, by August 1943, for Radio Tokyo. Later that year Toguri was asked to broadcast for the Japanese propaganda show "Zero Hour," which was tasked with lowering American troops' morale. An Australian broadcaster named Charles Cousens, who also worked for Radio Tokyo, had recommended Toguri for the position, hoping to make a mockery of the show due to her deep voice and slight lisp. Japanese troops had captured Cousens in Singapore and coerced him into working for Radio Tokyo in exchange for allowing him to read the names of Allied POWs, which Cousens believed would assist American families. For her part, Toguri went along with Cousens's subtle jests toward the station and its psychological warfare campaign. The Japanese authorities seemed none the wiser regarding the nuance of the