



IN MEMORIAM

Shiing- Shen Chern
Professor of Mathematics, Emeritus
UC Berkeley
1911–2004

Shiing- Shen Chern passed away in Tianjin, China, on December 3, 2004 at the age of 93. He had spent the last five years of his life in Tianjin.

Chern was born on October 26, 1911 in Jiaying, Zhejiang Province, China, 16 days after the revolution that overthrew the Manchurian Dynasty and ushered in modern China. Typically for that era in China, his schooling was haphazard. He had one day of elementary education, four years of middle- high school, and at age 15 skipped two grades to enter Nankai University. In 1932, when Chern was a graduate student at Tsing-Hua University, Wilhelm Blaschke from Hamburg visited China and gave some lectures on web geometry which opened Chern's eyes to the grand vistas in geometry. When Chern won a scholarship in 1934 to study abroad, he defied the conventional wisdom of going to the U.S. and chose to attend the University of Hamburg instead. This was the first of three major decisions in the period 1934 to 1943 that shaped the rest of his life. The second, in 1936, was to use a postdoctoral fellowship for study in Europe to study with Elie Cartan in Paris. The importance of Cartan's geometric work was not generally well understood at that time, but Chern had the opportunity to learn from the master himself. This made a lasting impression, and Cartan's influence on his scientific outlook can be seen on almost every page of Chern's four- volume Selected Papers (1978-1989).

During most of the Sino- Japanese War (1937-1945), Chern taught at the collective Southwest Associated University in Kunming, while studying the work of Cartan. He was beginning to make a name for himself in the international mathematics community, but he recognized that he still had to find his own mathematical voice. When an invitation to visit the Institute for Advanced Study (IAS) at Princeton came in 1943, he decided to accept in spite of the hardship of wartime travel. He reached Princeton in August. The visit to IAS was his third major decision of the decade, and perhaps the most important of all.

Chern's sojourn at the IAS from August 1943 to December of 1945 changed the course of differential geometry and transcendental algebraic geometry, and changed his life as well. Soon after his arrival at Princeton, he made a major discovery, namely, an intrinsic proof of the n - dimensional Gauss- Bonnet theorem. This important proof was the forerunner of other invariants which bear his name, Chern classes, Chern- Weil homomorphism and Chern- Simons invariants, which have become essential tools not only in differential geometry but in other areas of mathematics such as topology and algebraic geometry and also mathematical physics. A large part of modern algebraic geometry would not exist without Chern classes.

In the decades before 1944, the field of differential geometry had gone through a period of stagnation. Chern's results and new viewpoint revitalized and reshaped the subject. History will no doubt accord Chern his rightful place among the giants in geometry.

In April of 1946, Chern returned to China and was immediately entrusted with the creation of a mathematics institute for the Academia Sinica in Nanking. That he did, and became its de facto director (the official title was deputy director). By late 1948, the political situation in China had become so unstable that his friends in the U.S. began to be concerned about his safety. With the help of Robert Oppenheimer, then director of IAS, Chern and his family managed to land safely on U.S. soil on New Year's Day of 1949. He was a member of IAS for the spring semester, and in the fall he took a faculty position at the University of Chicago, where he would stay until he accepted the offer to come to Berkeley in 1960. Upon his arrival, he immediately attracted a group of young geometers, and Berkeley in the sixties and seventies became the geometry center of the world.

In addition to the ten Ph.D. students of the Chicago period, Chern supervised 31 Ph.D. students in Berkeley. In the late seventies, Chern brought two young geometers as visiting scholars from mainland China, which led to exchange agreements between Berkeley and several major Chinese universities. Soon after, other American universities followed suit.

Many honors came Chern's way during the Berkeley years, including election to the National Academy of Sciences in 1961, the U.S. National Medal of Science in 1975, and the Wolf Prize from the Israeli government in 1984. Later, he also received the Lobachevsky Prize from the Russian Academy of Sciences, in 2002, and finally the first Shaw Prize in Mathematics, in 2004. In 2002 he was Honorary President of the International Congress of Mathematicians held at Beijing.

Chern's leadership position in differential geometry was, if anything, enhanced by his work in his Berkeley years. The refined Chern classes on Hermitian bundles, Chern- Simons invariants, and Chern- Moser invariants all date from this period. His leadership was felt in other areas too, but most notably in the founding of two mathematics institutes. In 1981, the proposal he made jointly with Calvin Moore and I. M. Singer to establish an institute in mathematics on campus was officially approved by the government, and the Mathematical Sciences Research Institute (MSRI) was born. Chern served as its first director until 1984. In that year, he launched a second mathematics research institute at his alma mater, Nankai University in Tianjin. A main goal of the Nankai Institute has been to attract leading mathematicians to visit Tianjin and make it an active center of mathematics. Chern pursued this goal with vigor, and the Chinese government did its share in making foreign visitors welcome. When Chern finally returned to China for good in 1999, the well- being of the institute became his final project. He made ambitious plans that were only partially realized at the time of his death.

Chern is survived by his son Paul L. Chern, daughter May P. Chu, sister Yu- Hwa Shen, brother Chia- Lin Chen, and four grandchildren, Melissa, Theresa, Claire, and Albert. His wife of 60 years, Shih- Ning, passed away in 2000 in Tianjin.

Hung- Hsi Wu
Shoshichi Kobayashi
Alan Weinstein