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(*b.* Peking [Beijing], China, 18 April 1918; *d.* [New York](#) City, 25 June 1978)

mathematics.

H. C. Wang was a distinguished and versatile mathematician who made important contributions to algebraic topology, Lie groups and their homogeneous spaces, and discrete subgroups of Lie groups. Wang came from a family with an impressive intellectual and scholarly tradition. His great-grandfather, Wang I Rong (1845–1900), was a famous archaeologist and president of the Imperial Academy who, with his wife, committed a glorious suicide, that is, suicide as a protest, when foreign troops entered Peking during the Boxer Rebellion. His eldest brother, Wang Xian Jun, became a professor of philosophy and logic at Peking University. Another elder brother, Wang Xian Zhao, is a well-known meteorologist, and his elder sister, Wang Xian Tian, is a professor at the Institute of Psychology of the Academia Sinica (PRC).

Upon graduation from Nankai High School in Tientsin, Wang entered Tsing Hua University in Peking in 1936 as a student of physics. After the Japanese invasion in July 1937 the university fled to Kunming in southwest China and merged with Nankai and Peking universities. After a difficult journey of almost a year, Wang rejoined the university and resumed his studies, changing his field to mathematics. He graduated in 1941 and began graduate work under Shiing Shen Chern, one of the leading differential geometers of the twentieth century. By 1944 he had obtained an M.A. degree and written his first research paper. After a year of high school teaching he won a British Council scholarship and set sail for England, where he studied first at Sheffield, and then at Manchester under M. H. A. Newman. By this time Wang was a productive research mathematician and had written about a dozen papers, including two of his most important ones. In the first of these he discovered an important exact sequence (the Wang sequence) involving the homology groups associated with fiber bundles over spheres. It was used in Leray's work on spectral sequences. In the second he gave an essentially complete solution to a problem arising from the work of Hopf and Samelson: determine the closed subgroups of maximum rank of a compact Lie group G .

After receiving a Ph.D. from Manchester in 1948, Wang returned to China as a research fellow of the Institute of Mathematics of the Academia Sinica (Chinese National Academy of Science), and followed the institute to Taiwan shortly thereafter. In the fall of 1949 he became a lecturer at Louisiana State University and began a long, fruitful career in the [United States](#).

During his two years at [Baton Rouge](#) he wrote several more papers, among them his beautiful paper on two-point homogeneous spaces. In this paper he showed that a connected, compact metric space E , whose group of isometries carries a pair of points (p, q) to any pair (p', q') the same distance apart, is, in fact, a homogeneous space of a compact Lie group. Using this information he was able to enumerate all such spaces. Even in the noncompact case he obtained some results, later completed by J. Tits.

In the fall of 1951 he was invited for his first one-year appointment to the [Institute for Advanced Study](#) in Princeton, [New Jersey](#), after which he was appointed for two years at Alabama Polytechnic Institute, followed again by a year (1954–1955) at the [Institute for Advanced Study](#). It was during this period that he wrote a basic and important paper characterizing and classifying homogeneous complex manifolds, one of his works most often cited.

This was a very difficult time to secure employment in mathematics, especially for immigrants. Although this changed drastically by the late 1950's, it was still several years before Wang obtained a permanent position. The years from 1955 to 1957 were spent at the University of Washington in Seattle and then at [Columbia University](#) in [New York](#). In 1956 he married Lung Hsien (Lucy) Kuan. His first tenured position, at Northwestern University, came in 1957; he was made a full professor there the following year.

In 1958, in recognition of the importance of his work, Wang was invited to address the quadrennial International Mathematical Congress at Edinburgh, and in 1960 he was awarded a Guggenheim Fellowship to spend another year at the Institute for Advanced Study. At about this time he broke new ground in his research with an important study of transformation groups of n -spheres with an orbit of dimension $n-1$. This paper involves some clever and original ideas, as well as some formidable computations, and is a major departure from his earlier work.

As early as 1955 Wang had become interested in discrete subgroups of Lie groups, and in 1956 he published his first paper on this subject. This now became his major research area until the end of his career, resulting in several further important articles.

In 1965 and 1966 Wang spent a fourth year at the Institute for Advanced Study and then accepted a position at [Cornell University](#), which he held until his death. During his tenure there, as a result of the rapprochement between the [United States](#) and the People's Republic of China, he was at last able to visit his family and friends. He went to China again in 1973 after a sabbatical year in England at the University of Warwick, this time with his wife and three daughters, and he returned for a third time in 1977. A fourth visit was being planned at the time of his death.

Wang's last paper was published in 1973, after which his research was much curtailed because of his anxiety for his wife, who had developed cancer. His teaching and other mathematical and administrative activities continued unabated, however, and he played an important role in the department at Cornell. He was very much liked there, as everywhere, for his modesty, generosity, kindness, and courtesy. He was a fine teacher and lecturer, and he guided several students to Ph.D.s and subsequent productive careers. He enjoyed excellent health until he was suddenly stricken with leukemia in June 1978. He succumbed within weeks, to be survived for only a few months by his wife.

BIBLIOGRAPHY

I. Original Works. "The Homology Groups of the Fibre Bundles over a Sphere," in *Duke Mathematical Journal*, **16** (1949), 33–38; "Homogeneous Space with Non-vanishing Euler Characteristics," in *Annals of Mathematics*, **50** (1949), 925–953; "Two-point Homogeneous Spaces," *ibid.*, **55** (1952), 177–191; "Closed Manifolds with Homogeneous Complex Structure," in *American Journal of Mathematics*, **76** (1954), 1–32; "Compact Transformation Groups of S^n with an $(n - 1)$ -Dimensional Orbit," *ibid.*, **82** (1960), 698–748; "Topics on Totally Discontinuous Groups," in W. M. Boothby and G. Weiss, eds., *Symmetric Spaces* (New York, 1972), 459–487.

II. Secondary Literature. A memorial volume of the *Bulletin of the Institute of Mathematics, Academia Sinica*, **8** (1980), contains a discussion of Wang's life by S. T. Hu and of his work by W. M. Boothby, S. S. Chern, and S. P. Wang.

William M. Boothby