Stanley Stiles was born in London on 15 June 1901. He was educated at the Polytechnic Day School in London and in 1916 joined Johnson & Matthey as a learner assay chemist continuing his studies in the evening at Birkbeck College. In 1918 he won a scholarship to University College London to study chemistry, but one year later switched to physics as his main subject. After graduating in 1920 he stayed at University College for a further two years carrying out research under Professor W H (later Sir William) Bragg. From there he went to Cambridge to study mathematics, but left after one year to become a lecturer in physics and mathematics in Portsmouth, subsequently joining the Royal Naval Signal School.

In 1925 Stiles joined NPL, where he remained until his retirement in 1961. Initially he worked in the Photometry Section of Light Division investigating the problems of glare and visibility which were crucial to the rapid development of improved motor car headlights and streetlamps. He quickly made the useful distinction between disability glare (a reduction of visibility caused by a glare source which is not necessarily accompanied by discomfort) and discomfort glare (where glare is uncomfortable but does not necessarily interfere with seeing). His extensive studies of the visibility and radiance of a small circular test spot led to the formulation of the Holladay-Stiles equation of disability glare which was important in reconciling test results from research laboratories in Europe and the USA. He was also able to build glare meters which were used to take measurements on headlights and streetlamps and which allowed this equation to be verified in practice.

A major problem faced by Stiles in his work on vision was how to measure an observer’s pupil size in the field. Although photography was used, this did not prove to be satisfactory prior to the introduction of infrared film in 1935. In conjunction with his colleague B H Crawford, Stiles therefore designed and constructed a ‘pupilimeter’, but they found that it did not work - it constantly underestimated the sizes of wide pupils. Having eliminated all possible sources of error, they came to the conclusion - now known as the Stiles-Crawford intensity effect - that where the human eye is concerned rays of light entering the pupil considerably off-axis are less effective visually than those entering near the axis. Stiles later undertook experiments using monochromatic rather than white light, and found that the colour of such a light striking the identical point on the retina varies depending on the region of the pupil through which it passes - the Stiles-Crawford colour effect.

About 1937 Stiles began to address the most fundamental issue of colour vision theory concerning the response of the three types of cone photoreceptor in the human eye. Although it was commonly believed that these receptors had maximum sensitivities very close together in the middle of the spectrum, Stiles provided psychophysical evidence backed up by extensive theoretical analysis that the peak sensitivities of the three-cone mechanisms are widely separated from each other in the spectrum.

Throughout the Second World War, Stiles was required to concentrate on more applied work, but still in the field of glare and dazzle - particularly in relation to gunflash and searchlights, and the use of dazzle as a possible weapon. His distinguished contribution was rewarded by the award of an OBE in 1945, and thereafter he resumed his work on colour.

By 1951 a need had been identified to determine a new set of colour-matching functions based on direct radiometry. He therefore set about designing, constructing, aligning and calibrating the most sophisticated colorimeter in the world. The results produced using this NPL trichromator in the 1950s remain the benchmark standard for data of this kind.

Although he retired from NPL in 1961 at the age of 60, despite continuing ill health Stiles remained active in his scientific work for a further 20 years. He died on 15 December 1985 at his home in Richmond, Surrey, having made a lasting contribution to vision and colour science.