Stanley Greene was born in New York in 1949. As a teenager, he was a member of the Black Panthers and an anti-Vietnam War activist. Greene began his art career as a painter but started taking photos as a means of cataloging material for his paintings. He was a founding member of SF Camerawork, an exhibition space for avant-garde photography. He studied at the School of Visual Arts in New York, and at the Image Works in Cambridge, Massachusetts. An encounter with W. Eugene Smith turned his energies to photojournalism. Started working at News day in 1985 before that he photographed various rock bands. In 1986, he shot fashion in Paris. He called himself a "dilettante, sitting in cafes, taking pictures of girls and doing heroin". After a friend died of AIDS, he kicked his drug habit and began to seriously pursue a photography career.

He began photojournalism in 1989, when his image "Kisses to All, Berlin Wall" became a symbol of the fall of the Berlin Wall. In October 1993, he was trapped and almost killed in the White House in Moscow during a coup attempt against President Boris Yeltsin. He has covered the war-torn countries Nagorno-Karabakh, Iraq, Somalia, Croatia, Kashmir, and Lebanon. He has taken pictures of the genocide in Rwanda in 1994 and the US Gulf Coast in the aftermath of Hurricane Katrina in 2005.

Since 1994, he is best known for his documentation of the conflict in Chechnya, which was compiled in his 2004 book, Open Wound. These photos have drawn attention to the "suffering that has marked the latest surge in Chechnya's centuries-long struggle for independence from Russia".

In 2008, he revealed that he had hepatitis C, which he believed he had contracted from a contaminated razor while working in Chad in 2007. After controlling the disease with medication, he traveled to Afghanistan and shot a story about "the crisis of drug abuse and infectious disease".

He has won five World Press Photo awards for his work around the world. His work has been published in Libération, New York Times Magazine, Newsweek, Rolling Stone, Paris-Match, Time, Stern and Fortune, among others. He won the Alicia Patterson and the prestigious W. Eugene Smith Award in 2004. He was awarded a Katrina Media Fellowship from the Open Society Institute in 2006. His book Black passport was published in 2010 and released by Aperture. He continues to cover important world events.