

THE  KAVLI PRIZE
BIOGRAPHY
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Mildred S. Dresselhaus



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Mildred S. Dresselhaus was born to impoverished Polish immigrants in the Bronx, New York in 1930, at the start of the Great Depression. Her family was on welfare and her first school was far from a centre of excellence. Her brother was a musical child prodigy and, having started playing the violin at the age of four, she received a scholarship to attend a music school. Here she came into contact with children attending higher quality schools than her normal classmates. This inspired her to push for the same opportunities and at the age of 13 she won a place at Hunter College High School for girls.

Here Professor Dresselhaus studied hard but, as a young woman in the 1940s, she was advised that the only jobs open to her were schoolteacher, secretary or nurse. She might have followed that advice but for the inspiration provided by her physics teacher, early mentor and future Nobel

Laureate Rosalyn Yalow, who recognised her talent and encouraged her to take her early interest in science further.

Professor Dresselhaus graduated with a science degree from Hunter College with the highest honours possible in 1951 and went on to become a Fulbright Fellow with a year at Newnham College at the University of Cambridge, England. She returned to the United States to gain her master's degree at Radcliffe College in Cambridge, Massachusetts in 1953 and obtained her Ph.D. at the University of Chicago in 1958. It was here that she began studying superconductors, the eventual subject of her doctoral thesis. It was a hot topic in solid-state physics, and her choice led to her meeting with fellow physicist Gene Dresselhaus, whom she married in 1958.

Two years after their wedding they were both offered jobs at the Massachusetts Institute of Technology's Lincoln Lab. It can be argued that Professor Dresselhaus's instincts as an outsider in the male-dominated world of physics and 1960s academia helped her make choices that ended up being to her advantage. She entered a new field, magneto-optics, and rather than following the crowd in investigating semiconductors, she deliberately sought out the less competitive study of graphite. Her superiors were sceptical of this choice and early experiments were disappointing because it was difficult to get good magneto-optical spectra. This all changed when she obtained samples of a new synthetic carbon material called pyrolytic graphite. The resulting high quality spectra and her understanding of the special symmetry of graphite allowed Dresselhaus to characterise its electronic band struc-

tures far more accurately than had previously been achieved.

The couple had four children in quick succession, and some of her superiors were less than sympathetic to her need to juggle work and childcare commitments. In 1966 it was decided that all researchers at the Lincoln Lab should start work at eight 'clock in the morning. This rule was clearly not created by someone with four children all under the age of seven, as Professor Dresselhaus had at the time. By now however she was becoming known on the MIT campus and her contacts smoothed the way to a visiting faculty appointment to the electrical engineering department at MIT under the Abby Mauze Rockefeller Fund, set up to promote the scholarship of women in science and engineering. This turned into an appointment as the first female tenured professor in MIT's engineering department in 1968.

Once described as the "Queen of carbon", Professor Dresselhaus has served as a role model and mentor for many young female scientists. She became head of the Centre for Materials Science and Engineering in 1977, became a Physics Professor in 1983 and Institute Professor in 1985. Dresselhaus received the US National Medal of Science in 1990 and earlier this year President Barack Obama announced she had become the co-recipient of the Fermi Award. Professor Dresselhaus has served as treasurer of the US National Academy of Sciences, President of the American Physical Society and the American Association for the Advancement of Science.

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