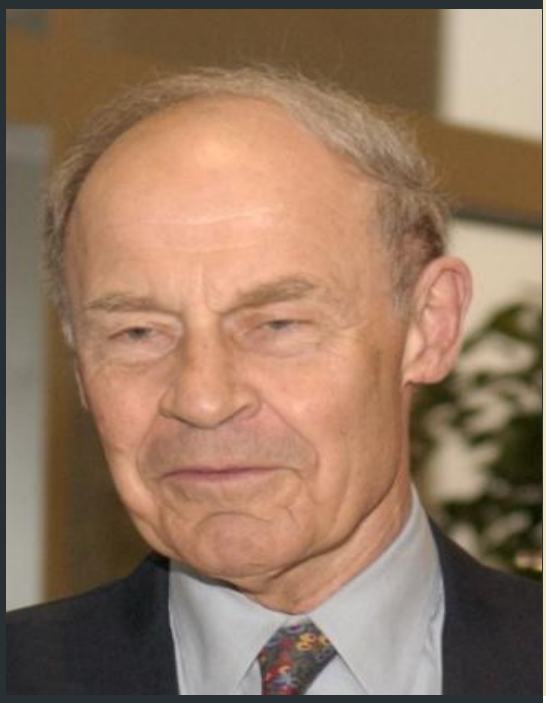

Dudley R. Herschbach

GRFP Recipient: 1955

Undergraduate Institution:
B.S. Mathematics,1954, Stanford University

Graduate Institution:
M.S. Chemistry,1955, Stanford University

A.M. Physics, 1956, Ph.D. Chemical Physics, 1958, Harvard University

Graduate Field of Study:
Chemistry and Chemical Physics

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Current Position:
Baird Professor of Science, Emeritus, Harvard University; Distinguished Professor of Physics, Texas A&M University

RESEARCH INTERESTS //

Dudley R. Herschbach received the Nobel Prize in 1986 for his contributions to the understanding of the dynamics of chemical elementary processes. This work developed experimental methods and theory that enabled intimate study of chemical reactions in single collisions between pairs of molecules. In other research, likewise done with many students and colleagues, Herschbach has ranged widely in other frontier fields. These include elucidating molecular interactions in liquids and solids via high-pressure experiments as well as theoretical analysis of enzyme-DNA kinetics and a novel treatment of electronic structure derived from a simplifying limit in which the spatial dimension becomes infinite. Herschbach has long pursued efforts to improve science education and public understanding of science. He has given many talks at middle and high schools, both in the US and abroad, often emphasizing kinships between science and art and drawing lessons from the lives of Benjamin Franklin, Albert Einstein, Madame Curie and Helen Keller. Herschbach also served (1992-2010) as chairman of the board for the Society for Science and the Public, which publishes Science News and conducts major science fairs. Among many radio and TV appearances, his briefest but most noted was as a guest voice on The Simpsons.

BROADER IMPACT OF MY WORK //

Considered a "lunatic fringe" effort when launched 50 years ago, the work on single-collision reaction dynamics, commemorated by the Nobel Prize, proved a strong stimulus to other research that much enlarged the scope of molecular-level chemical physics, now pursued in hundreds of labs world-wide. Much of Herschbach's work in other fields has likewise opened or enhanced new research vistas. Beyond research contributions, his broadest impact on society has likely come from his earnest devotion to teaching and mentoring, and his enthusiastic efforts to convey to a wide public science as a grand human adventure.

A PERSONAL ANECDOTE OF THE BENEFIT FROM THE *GRF* PROGRAM //

The NSF Fellowship, 1955-56, enabled me to start research with E.B. Wilson's group right away, while also taking a full load of four graduate courses each semester. Thus, I completed a major part of my Ph.D. research and all my course work in that year.

An important note: In 1955 at Harvard, 33 of the 35 entering graduate students in chemistry or chemical physics had their own fellowships, some from NSF, and many from private corporations. That certified students as national resources rather than hired hands on a research project. It profoundly influenced students' outlook and approach to grad study and the time to complete the Ph.D. was usually close to four years, often less. For more comments on grad study, see my Harvard website, particularly the Festschrift Interview and my essay, "Einstein as a Student."

A FOND MEMORY FROM MY EXPERIENCE AS A FELLOW //

My NSF year brought many exhilarating experiences. Several are described in my paper, "Fifty Years in Physical Chemistry: Homage to Mentors, Methods, and Molecules," Ann. Rev. Phys. Chem. 51, 1-39 (2000). Among the most significant was recognizing and demonstrating a way to overcome a roadblock that had stymied Wilson's research group for a couple of years. As a rookie in the field of microwave spectroscopy, this early success did a lot to build confidence that I could come up with good ideas.

AWARDS/ HONORS //

- American Academy of Arts and Sciences (1964)
- Pure Chemistry Prize, American Chemical Society (1965)
- National Academy of Sciences (1967)
- Linus Pauling Medal (1978)
- Michael Polanyi Medal (1981)
- Irving Langmuir Prize, American Physical Society (1983)
- Nobel Prize in chemistry (1986)
- Royal Chemical Society of Great Britain (1988)
- American Philosophical Society (1989)
- National Medal of Science (1991)

Jaroslav Heyrovsky Medal, Czech Academy of Science (1992)

Honorary Life Member. Association for Women in Science (1998)

Amierican Institute of Chemists Gold Medal (2011)

POSITION PROFILE //

1957 – Junior Fellow, Society of Fellows, Harvard University

1959 - Assistant professor of chemistry, University of California, Berkeley

1961 - Associate professor of chemistry, University of California, Berkeley

1963 - Professor of chemistry, Harvard University

1976 – 2003 Baird Professor of Science, Harvard University

2005 – Professor of physics, Texas A&M University

Molecular Physics (Volume 110, numbers 15-16, August, 2012) published a Festschrift for Dudley Herschbach, titled "Scaling Mount Impossible." In addition to 40 scientific papers, it includes an extensive Interview (41 pages).The Interview and much else is available at www.chem.harvard.edu/herschbach/dudley-php.

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