

**MEMORIAL RESOLUTION OF THE FACULTY OF THE
UNIVERSITY OF WISCONSIN-MADISON**

ON THE DEATH OF EMERITUS PROFESSOR JOHN ATWATER DUFFIE

John (Jack) A. Duffie was born in White Plains, New York, on 31 March 1925. At Rensselaer Polytechnic Institute he received a BChE degree in 1945 and a MChE degree in 1948. He received a PhD degree in chemical engineering at the University of Wisconsin in 1951 under Professor W. R. Marshall, Jr. Beginning in 1951 Jack spent one-half year with the DuPont Company and two years as scientific liaison officer with the US Office of Naval Research (1951-1953). Jack joined the Engineering Experiment Station in 1953 and in 1957 was appointed as an assistant professor in the Engineering Experiment Station. In 1965 he became officially affiliated with the Department of Chemical Engineering as professor. He served as director of the Solar Energy Laboratory (1956-1988), associate dean of the Graduate School (1965-1976), and director of the University-Industry Research Program (1965-1972).

Jack devoted most of his active career (and his retirement career) to solar energy. With Professor Farrington Daniels he coauthored a book on solar energy: *Solar Energy Research*, University of Wisconsin Press, Madison (1955). Subsequently, he coauthored books with Professors W. A. Beckman (1974, 1977, 1981, 1991 and 2005) and S. A. Klein (1977) of the UW Mechanical Engineering Department faculty. He was president of the International Solar Energy Society (1971-1973) and served as the editor-in-chief of the *Journal of Solar Energy* (1985-1994).

During the first decade, Jack's international activities were concerned with the research programs on the industrial and domestic use of solar radiation, particularly directed toward applications in developing countries. In these activities many departments of the university participated. In field trips to find out the acceptability of solar processes and devices in developing countries, and in lectures at universities and scientific conventions on solar radiation, Jack visited Mexico, India, Egypt, and several South American countries.

In 1964-1965, Jack had a sabbatical at the University of Queensland and at the Commonwealth Scientific and Industrial Research Organization (CSIRO) in Melbourne, supported by grants from the Guggenheim and Fulbright Foundations. The year in Australia resulted in a major shift in emphasis in his research program. This major change in direction was an unplanned and unexpected outcome of Jack's year "down under." At Queensland he had the opportunity to work on a new analog computer. It became obvious that this provided a way to solve the equations that describe how solar (and other unsteady) processes work.

Armed with this new technique, the second phase of Jack's solar program began later in the 1960s: the various aspects of simulation of solar processes, and the development of methods of predicting their performance over long periods. Mechanical Engineering Professors Bill Beckman, Sandy Klein, and John Mitchell were instrumental in this work. Even in 2005, the Solar Energy Lab is still concerned with the simulation of transient processes, and the methods they developed remain the standard way of doing these computations.

The relation between the UW Solar Energy Lab and CSIRO continued to be close for years. Jack returned to CSIRO for six months in 1977. They had a joint research program on solar-operated desiccant cooling cycles, spearheaded at UW by John Mitchell. Bill Beckman spent a year at CSIRO in 1968 and again in the 1978, and there have been other exchanges as well. Also, D. J. Close of CSIRO spent a year at the Solar Energy Laboratory in Madison, and W. J. Howarth one year with Professor E. J. Crosby in the Chemical Engineering Department.

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Among the students of many university departments participating in the solar radiation program at Wisconsin, sixteen in chemical engineering have taken part, eleven of whom have received MS degrees, and four PhD degrees, the latter being Duane A. Williams (1961), Awinash T. Talwalkar (1964), James E. Davis (1965), and Sanford Klein (1976). Duffie's continued interest in devising sound engineering designs for using the sun's energy (particularly for water heating and space heaters) has been recognized by the following awards:

Fellow, American Institute of Chemical Engineers (1977)
The Byron Bird Award of the UW College of Engineering (jointly
with Professor William Beckman of the Mechanical Engineering Department) (1981)
The Charles Greeley Abbott Award of the American Section of the
International Solar Energy Society (1976)
The Farrington Daniels Award of the International Solar Energy
Society (1987)

In 1988 he became a professor emeritus but maintained his activities and interest in solar energy. During his retirement years he has worked on a history of the first quarter century of the International Solar Energy Society, which was founded (under a different name) in 1955.

In 1947 Jack married Patricia Ellerton. The Duffies have three children: Neil (1950); Judith (1952); and Susan (1958). Their son is on the faculty of the Department of Mechanical Engineering and has served as its chairman. For recreation, the Duffies have a cabin on a lake in the woods in Vilas County (adjacent to the property of Chuck and Lois Curtiss of the Chemistry Department), where the family enjoys vacations involving swimming, sailing, hiking, and fishing. Jack's hobbies were woodworking and color photography.

For many years Jack went jogging with a group that started from the "Shell" and went to a hill in the arboretum. On 28 March 2004, this group celebrated Jack's 79th birthday at Oakwood Retirement Community, where he was given a framed picture of a new sign at the top of "Duffie's Hill," Arboretum Lane, in the arboretum. He passed away on 23 April 2005, shortly after his 80th birthday.

MEMORIAL COMMITTEE

William A. Beckman

R. Byron Bird

Sanford A. Klein

Daniel J. Klingenberg