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A tribute to Dick Askey

Tom Koornwinder*, Walter Van Assche[†] and Ole Warnaar[‡]

February 2015 (last minor corrections 14 May 2015)

Richard A. (Dick) Askey¹ was born June 4, 1933 in St. Louis, Missouri. He received his PhD at Princeton University in 1961 under the direction of Salomon Bochner. After instructorships at Washington University and the University of Chicago he joined the faculty of the University of Wisconsin-Madison in 1963, where he became full professor in 1968. Since 2003 he is Professor Emeritus at that same institution. Dick received many awards and distinctions during the course of his mathematical career. He was elected member of the American Academy of Arts and Sciences in 1993 and of the National Academy of Sciences in 1999. Furthermore, he is a Honorary Fellow of the Indian Academy of Sciences and a Fellow of SIAM and of the American Mathematical Society. In 1983 he was an invited speaker at the International Congress of Mathematicians (ICM) in Warszawa. In 2012 he received an honorary doctorate from SASTRA University in Kumbakonam, India.



Dick Askey's research interests are Special Functions and Orthogonal Polynomials, and more generally Classical Analysis. His works often touch upon aspects of approximation theory, harmonic analysis, number theory, combinatorics and probability theory. He published² 140 research articles in journals, conference proceedings and edited books. His most frequent coauthors are George Gasper, Mourad Ismail and Stephen Wainger. Dick's research publications include two AMS Memoirs: one written with Mourad Ismail in 1984 [7], and one with James Wilson in 1985 [8] on the Askey-Wilson polynomials, probably his most influential publication. This memoir also gave for the first time the directed graph of hypergeometric orthogonal polynomials which became universally known as the *Askey scheme* (MSC code 33C45). An inequality in his 1976 paper in Amer. J. Math. coauthored with George Gasper [6] was decisive for Louis de Branges [13] to settle the Bieberbach conjecture (1985).

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¹Biographical data from [11], [12]

²Bibliographical data at [11], [12], [10]

Dick wrote two books. The relatively early one in 1975, published by SIAM, were Lecture Notes in the Regional Conference Series [3]. These notes gave a broad overview of all insights which Dick had accumulated in his “classical period”, before he caught the q -disease. A state of the art in this area appeared also in Dick’s edited volume [4] based on the invited lectures at the 1975 Madison conference. The book *Special Functions* [1], written jointly with George Andrews and Ranjan Roy, and published by Cambridge University Press in 1999, has established itself as the standard text on the subject.

Dick has been co-editor of several other Conference Proceedings, and has written a large number of expository papers. Many of these are on topics in the history of mathematics, another area in which he has great interest. Two of his heroes are Gabor Szegő, whose Collected Papers [5] he edited and supplied with ample comments (three volumes published by Birkhäuser, 1982), and Ramanujan (the name is occurring in some twenty titles of his list of publications). Handbooks of formulas already had Dick’s interest early in his career. He wrote critical evaluations of existing ones, and later became actively involved in the preparation of the NIST Digital Library of Mathematical Functions (DLMF) [15] as an associate editor and coauthor of three chapters. A special interest of Dick—the one on which he spends most of his current time—is Mathematics Education. His publication list mentions twelve articles by him on this topic, and he probably has written many more.

There is no doubt that the revitalization of special functions within mathematics and the opening up of new fields of application during the last fifty years can to a large extent be attributed to Dick. His many influential publications coupled with his tireless efforts to advertize and popularize the subject have been absolutely crucial. Dick has advised 13 PhD students, including Dennis Stanton and James Wilson, but many more have been his students informally. Indeed, he has inspired countless mathematicians in the field, and interacted with many through letters, telephone calls, e-mails and of, course, at meetings. To this day he keeps reminding us of his favorite unsolved problems, crying out for the attention of a smart young mathematician.

The work of Dick Askey has been reviewed in earlier dedications: in SIAM J. Math. Anal. (1994) [2] on the occasion of his sixtieth birthday, also highlighting the long-term editorships of Frank Olver and Dick Askey of this journal, and in Contemporary Mathematics (2000) [14], on the occasion of his sixty-fifth birthday. We feel that the following quote from [2] is still very appropriate:

“Although Dick proudly and jokingly classifies himself as one of the last breed of 19th-century³ mathematicians, he is, in fact, very much a 21st-century mathematician. He helped to keep classical analysis alive and interacting with modern mathematics. He has pursued excellence in every aspect of mathematics, including teaching, libraries and history, and has given never ending encouragement and support to younger colleagues, including those in crises (political, economic, personal, and scientific). Many of us feel that he is a bridge between the great classical analysts such as Hardy, Littlewood, Ramanujan, Pólya, and Szegő, just to name a few, and future mathematics and related areas.”

A two-day conference celebrating *Dick Askey’s 80th* birthday was held in Madison in December 2013. See [9] for the slides of the lectures and the photo gallery. The present volumes, again

³[2] had erroneously “18th-century”

celebrating Dick's eightieth birthday, are independent of this meeting. Many authors, young and old, inspired by Dick's enthusiasm, have contributed.

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