Dr. Abolghassem Ghaffari

Short Biography

Abolghassem Ghaffari, L-es-Sc., Dr. Sc. (Paris) and Ph.D (London), was born in Teheran on June 15, 1907, and educated at Darolfonoun School (Teheran). In 1929, he went to France and studied Mathematics and Physics at Nancy University, where he took his L-es-Sc. in Mathematics in 1932. After obtaining post-graduate diplomas in Physics, Astronomy, and Higher Analysis, he worked on Mathematical Physics with Professor Maurice Frechet at the Sorbonne (Paris University). There he obtained in 1936 his Doctor of Sciences with "Mention tres honorable"' for basic research on Mathematical Study of Brownian Motion and spent four months at Paris Observatory to work on problems in Celestial Mechanics. In 1937, he joined the Faculty of Sciences of Teheran University, where he was appointed full Professor of Higher Analysis from 1941 to 1956.

He was in military service from 1938 until 1941. During military service, he was attached to the Section of Geodesy of the Military Geographical Department of the General Staff of Iran, and directed field work on triangulation and leveling of the northern area of Teheran District. In addition, he wrote two textbooks on Astronomy and Geodesy.

In addition to his teaching at Teheran University, he also lectured on General Mathematics and Geodesy at the Military Academy and Higher Technical Institute in Teheran from 1941 to 1945.

In 1946, by invitation of the King's College (London University) and as a "British Council Scholar", he went to London and did research work with Professor George Temple on "Supersonic Flow." In 1948, he received from the Mathematics Department his Ph.D. on the "Velocity-Correction Factors and the Hodograph Method in Gas Dynamics." He lectured, as Research Assistant, at King's College (London, 1947-48), on Differential Equations and Function of a Complex Variable, and also gave eight lectures on Gas Dynamics in the Graduate School. At Imperial College (London) and Queen's College (Oxford), he worked with Professor Sydney Chapman on some problems of Mathematical Physics. While at Oxford, he studied relativity with Professor E.A. Milne.

In September 1948, he returned to Teheran and resumed his mathematical teaching at Teheran University. From 1949 to 1955, he was also a consulting mathematician and actuary at the Iran Insurance Company in Teheran.

In 1950, by invitation of Harvard University and as a "Fulbright Scholar", he went to Harvard University as Research Associate to lecture on Differential Equations and to continue his research on Gas Dynamics. He was elected a Temporary Member of the Institute for Advanced Study (Princeton) and also Research Associate in Mathematics at Princeton University, 1951 to 1952, where he worked with Albert Einstein on the Unified Field Theory of Gravitation and Electromagnetism, and with Professor Martson Morse and Professor Solomon Lefschetz on Differential Equations in-the-Large.

During summer vacation periods, he worked at John Hancock Mutual Life Insurance Company, Boston, Mass., in 1951, at the Metropolitan Life Insurance Company, New York City and at the Ministry of Pension and Insurance of Great Britain, London, England in 1952.

In September 1952, he returned to Teheran University and lectured particularly on Ordinary Differential Equations and on the Differential Equations of Mathematical Physics.

In September 1956, he was appointed a senior mathematician at the U.S. National Bureau of Standards, Mathematical Physics Division, where his research activities included such topics as:

a) Aerodynamic problems of compressible flow past a wedge (Hodograph method).
b) Theory of two-phase jet propulsion devices (with Professor J.M. Burgers).
c) Nonlinear vibrations connected with impact and vibration of airplane landing gear (using Poincare's approach).
d) Mathematical Theory of Brownian Motion.
e) Some mathematical aspects of magneto-gasdynamics, and especially the problems of exact solutions of flow equations of magneto-gasdynamics.
f) Application of Bogoliubov-Mitropolsky asymptotic methods to nonlinear, nonautonomous differential equations encountered in the motion of the artificial Earth Satellites.

From 1957 to 1958, as Visiting Professor of Mathematics, he gave a graduate course on Partial Differential Equations at the Graduate School of the National Bureau of Standards. In 1958, he was appointed Professorial Lecturer of Mathematics and Statistics at the American University in Washington, D.C., and taught graduate courses there on Ordinary Differential Equations and Partial Differential Equations from 1958 to 1962.

In February 1964, he was transferred to NASA Goddard Space Flight Center, Greenbelt, Maryland, as an aerospace scientist, where he studied the mathematical aspects of different optimization techniques involved in the Earth-Moon trajectory problems, and different analytical methods for multiple midcourse maneuvers in interplanetary guidance. He later investigated the effects of solar radiation pressure on the Radio Astronomy Explorer Satellite Booms as well as the effects of General Relativity on the orbits of Artificial Earth Satellites.

In September 1971, he was elected Professor Emeritus from Teheran University.

He retired from NASA in 1972. Since then, he has continued his research on Astrodynamics and planetary guidance and control.

He was awarded in Iran the Imperial Order of Homayoun and the Academic Orders of Danesh and Sepass; and the U.S. Special Apollo Achievement awards (1969) and the Apollo 11 Commemorative Certificate in the U.S.A.

He has published more than 50 papers on Pure and Applied Mathematics in American, British, and French, and Persian periodicals. In addition to two textbooks, he is author of the mathematical book "The Hodograph Method in Gas Dynamics" (1950), which has been recommended by the Bulletin of the American Mathematical Society, Mathematical Reviews, Mathematical Gazette, Applied Mechanics Reviews, and the Indian Mathematics Students Periodical.

He is married and has two children. He is a U.S. citizen and has obtained his clearance for both the NBS and NASA.

He is a Fellow of:

a) New York Academy of Sciences
b) Washington Academy of Sciences
c) American Association for the Advancement of Sciences

A member of:

a) London Mathematical Society
b) American Mathematical Society
c) The Mathematical Association of America
d) American Astronomical Society

A past member of:

a) The Iranian Academy
b) Iranian Higher Council of Education
c) Iranian National Commission of UNESCO