

Donald A. MacRae
1916-2006

With the passing of Donald Alexander MacRae on December 6, 2006 at age 90, the astronomy community lost a visionary scientist and a pillar of the Canadian astronomy community. Under his leadership during the 1960's and 1970's the Department of Astronomy (now Astronomy and Astrophysics) of the University of Toronto grew into a diversified and internationally recognized institution. Graduates of the department and their scientific descendants now constitute nearly half of all members of the Canadian Astronomical Society.

Don MacRae was born in Halifax, Nova Scotia on February 19, 1916. After the family moved to Toronto, where he received most of his early education, he obtained his undergraduate degree in Mathematics and Physics in 1937 from the University of Toronto. He obtained the degree of A.M. in 1940 and Ph.D. in 1943 from Harvard University under the mentorship of Bart Bok in the field of galactic structure. During his early career he worked briefly at the University of Pennsylvania, Cornell University, and at Carbide and Chemical Corporation at Oak Ridge, Tennessee. For Don the latter work was a brief and somewhat uneasy association with the Manhattan Project. In 1946, he obtained a position at Case Institute of Technology (now Case Western Reserve University), where he worked until 1953. In 1953, he accepted a position at the University of Toronto, replacing Ralph Williamson, who had earlier introduced Don to the emerging field of radio astronomy while they both were at Cornell.

Don's primary research field was stellar spectroscopy, but his interests were much broader than this, and he possessed an abiding ability to interest students and faculty in new and emerging ideas. In the early 1960's he developed a strong interest in the nature and origin of the lunar surface, and discussed these extensively with colleagues. Many of his ideas on this subject were later confirmed by the lunar exploration program. Don's continuing interest in radio astronomy led him to introduce this subject area into the Toronto graduate research and teaching curriculum. In collaboration with the Department of Electrical Engineering, he established a radio astronomy observatory on the grounds of the David Dunlap Observatory (DDO) in 1956. This was at a time when few astronomers took this subject seriously.

The DDO work led to the precise determination of the absolute flux density of Cas A at 320 MHz, a radiometric standard as important today as it was when it was reported in 1963. As this work was completed, radio frequency interference was becoming a severe problem, and plans were underway to build a complement of antennas at the University of Toronto site of the National Research Council's (NRC's) new Algonquin Radio Observatory in Algonquin Park. Radio observations were continued there for a short period, but around 1965, interest became focused on the capabilities of the newly constructed 46m telescope, Canada's new and powerful national observing facility.

The radio astronomy program that Don established was an early stimulus for the first successful experiment in Very Long Baseline Interferometry in 1967, collaboration among the UofT, Queen's University and NRC.

As a teacher, Don was highly regarded by his students, whom he engaged with his characteristic wit and frequent anecdotes. His lectures were always well prepared and organized, and endowed with an underlying belief that the ideas and principles of physics were most easily understood by applying them first to the stars. He was as innovative in teaching as he was in promoting new research directions. He is regarded as the first professor at Toronto to teach computer programming at the university, recognizing early that students would need such skills in their scientific careers. Programming became an integral part of astronomy laboratory work long before Computer Science became a recognized discipline at the university.

Similarly, he was a strong advocate for public outreach, and participated enthusiastically in the Saturday evening tours at the DDO. Many of us remember the Oscar-nominated short film "Universe" produced in 1960 by the National Film Board, featuring the DDO and Don MacRae as the astronomer working with the observatory's 74" telescope. Realizing that a major planetarium was needed in Toronto to serve both the public and the university, he cooperated with colleague Victor Meen at the Royal Ontario Museum (ROM) to attract financial support for the McLaughlin Planetarium, which opened at the ROM in October 1968. In honour of his strong record in education, the UofT established an undergraduate scholarship in his name in 2003 to reward promising undergraduates in the astronomy program.

In 1965, Don became Head of the department and Director of the DDO, and continued in these positions for 13 years. During this period, he presided over a major expansion of the Department which made it the major centre of astronomical activity in Canada. This expansion was accompanied by a new diversification into the areas of radio astronomy and theoretical astrophysics, which together came to occupy about 50% of departmental activity. New telescopes were acquired for teaching and research, including a 24-inch at DDO for photometry, and most significantly, a 24-inch telescope at Las Campanas, Chile, site of the Carnegie Southern Observatory. The new southern observatory, established in 1971 as the University of Toronto Southern Observatory, became the first Canadian offshore astronomy facility. The clear weather and excellent seeing conditions at Las Campanas attracted many graduate students to study astronomy at the UofT. It was also used by many astronomers from other institutions. As part of the arrangement with Chile for the location of the observatory in Chile, many Chilean graduate students were educated as astronomers at Toronto.

Don MacRae was an active participant in the establishment of national observing facilities for all Canadian astronomers. He supported the establishment the Algonquin Radio Observatory in the 1960's to serve the growing community in the emerging field of radio astronomy. He was a tireless advocate for the acquisition by Canada of a significant share in a major optical observatory at the best possible observing site in the world. He participated in the planning and development of the Canada-France-Hawaii-Telescope (CFHT) on Mauna Kea, Hawaii in the 1970's, and served as one of four Canadian astronomers on the Board of the CFHT Corporation from 1973 to 1979. He was also an early advocate for university participation in space

astronomy. During the 1970's he was elected to the Board of Trustees of the Universities Space Research Association (USRA), and served as Board Chair in 1973. USRA was a U.S. organization dedicated to promote cooperation between NASA and North American universities.

Although Don retired in 1982 and was appointed Professor Emeritus in the department, he continued his interest in departmental activity for many years after. He maintained an abiding ambition to create a leading department and to help in establishing a world renowned astronomical community in Canada. His legacy is that he succeeded in both areas.

Credits to the University of Toronto