The path of Nancy Millis towards the career in industrial microbiology in which she became pre-eminent ran neither smooth nor straight. Her father’s severe illness cut her school life short in 1937 and a perforated intestine while she was on a research trip to study the agricultural practice of women in New Guinea in 1944 almost killed her. It was, however, during her recovery from this latter disaster that she took up a doctoral studentship at the University of Bristol offered by Boots, the English pharmaceutical firm, to investigate spoilage in cider. As well as allowing her to taste the product, this research led to her later becoming a judge of cider at Victorian wine shows.

She graduated Ph.D. from Bristol in 1952 and returned to Melbourne where she joined the Department of Microbiology under Professor Sydney Rubbo. In 1954, Rubbo encouraged her to take up an American Association for University Women scholarship to the University of Wisconsin, Madison. Her research into fermentation was extended when she took sabbatical leave in 1963 to work with Suichi Aiba at the Institute of Applied Microbiology at Tokyo University. This work formed the foundation of the course Millis subsequently established at Melbourne and the lectures she gave in Tokyo with Aiba and Arthur Humphrey form the basis of Biochemical Engineering, first published in 1965 and still a standard textbook in the field.

Nancy Millis was only the fourth woman to be appointed as a Professor at the University of Melbourne, her achievements recognised with the award of a personal chair in 1982. In the same year she published Microbial Physiology and Genetics of Industrial Processes with A. James Pittard. She chaired the Recombinant DNA Monitoring Committee, set up in 1980 to advise on the likely effects of proposals for genetic research involving transfer of genes between organisms.

Nancy Millis has been a member of the Board of Management of the Fairfield Infectious Diseases Hospital, the Australian Water Advisory Resources Committee, the Cooperative Research Centre for Freshwater Ecology, the Council of the Australian Academy of Technological Sciences, the National Commission for UNESCO and many other professional organisations. She was President of University House in 1987 and appointed Chancellor of La Trobe University in 1992.

Professor Millis was awarded an MBE in 1977 and in the same year was elected as a Fellow of the Australian Academy of Technological Sciences. She was made a Companion of the Order of Australia in 1990. In 1993, she was awarded an honorary D.Sc. from the University of Melbourne and in 2002 was one of five Australian scientists featured on Australian stamps.