Wendy Robertson
1927–2016

Wendy Robertson was a renowned mathematician, an inspiring teacher, and a highly respected colleague. Her book on topological vector spaces, published with her husband Alex Robertson in 1966, continues to be cited to this day. She came to Perth in 1973 with Alex who had been appointed to the inaugural Chair of Mathematics at Murdoch University. Wendy held a senior lectureship in mathematics at the University of Western Australia from 1973 until her retirement in 1989.

Wendy Robertson was born in 1927 in Wembley Park, which was then on the outskirts of London, and her only sibling, a brother Stanley, was born three years later. Her father, David Sadie, was a silk merchant. Her mother, Deborah Sadie (née Simons), who was a middle child in a family of 12, left school at the age of 14 to work as a secretary, and help support her family; she bobbed her hair and participated in the suffragette movement of the 1920s in London. Wendy was very close to her father who built her a large and wonderful dolls' house modelled on their own house, which became one of her most treasured possessions. Her childhood was a happy one despite her family home being bombed during World War II. Wendy won a scholarship to St Paul's Girls' School, and then, in 1946, she won a 'Major Scholarship' to Girton College, Cambridge, becoming one of the small number of women admitted to read mathematics there. She completed Part II as

wrangler in 1948, and then Part III with distinction, gaining her BA in 1949. She then commenced research in functional analysis under the supervision of Frank Smithies, and supported by an M. T. Meyer Research Studentship (1949–51). Bertha Swirles (Lady Jeffreys), who held an Official Fellowship and was Director of Studies in Mathematics at Girton College from 1949–69, described Wendy as the best student she had ever taught (in conversation with Cheryl and Ruth Williams over tea at Girton College in the 1990s).

During her time in Cambridge, Wendy met Alexander Provan Robertson, and they married in 1951. Wendy continued working on her doctoral research after she and Alex moved to Glasgow, and while she taught mathematics at Glasgow University. Her first child Lorna was born in 1953 interrupting her teaching career. Her research continued with the award of an M. T. Meyer Research Bye-Fellowship at Girton (1954–55), and by the time she completed her PhD in 1955 she was pregnant with her son Philip.

By 1957 her third child Clare had arrived. When Clare was of kindergarten age, Wendy returned to teaching at the University of Glasgow until her fourth child Rachel was born in 1963. She continued to give courses each year in the Extra-mural Department at Glasgow through to 1965, when the family moved to Keele just prior to the birth of her fifth child Vivienne. Whilst there she gave courses through the Department of Adult Education. She managed a fairly steady stream of mathematical work at home, including PhD examining, refereeing for journals, reading manuscripts for publishers, and book reviews. She regularly attended seminars both in Glasgow and Keele, and she also maintained an active research life, publishing several journal articles and an immensely influential book. After spending six months in Perth in 1969 on visiting appointments at the University of Western Australia, Alex and Wendy decided to move permanently to Western Australia in 1973: Alex as inaugural Chair of Mathematics at Murdoch University and Wendy to take up a Senior Lectureship at UWA. Alex and Wendy actively encouraged interactions between the mathematicians at Murdoch University and their colleagues at the University of Western Australia, promoting joint research seminars and hosting many social events (as outlined further in the obituary for Alex at www.austms.org.au/Gazette/1995/Oct95/robertson.html). Wendy was a dedicated, committed, and inspiring teacher, a mentor to younger staff and a diplomatic administrator.

Wendy's first paper (co-authored with Alex) 'On the closed graph theorem' was published in 1956 and their co-authored book, *Topological Vector Spaces*, was published by Cambridge University Press in 1964, reprinted in 1966, and then in a second edition in 1973. The book, and its translations into German and Russian, has been widely used as an advanced text for graduate students.

Wendy's research reverberates in the current work of Stephen Saxon, whose 'Baire-like spaces' (1972) cited Wendy's first paper. Her last three papers, from 1988 and 1989, are cited in five articles written since 2014 by Stephen and coauthors, the latest dedicated to her memory. Jointly with Luis Sánchez Ruiz, Stephen solved the countable enlargement (CE) problems for separable weak barrelledness in 'Reinventing weak barrelledness' (2017). Ian Tweddle and Wendy, his mentor,

were principal exponents of CEs. Their barrelled CE problem remains open: if (E, τ) is a barrelled space with continuous dual $(E, \tau)' \neq E^*$, must there be a finer barrelled topology $\mathcal{T}$ on E such that $(E, \tau)'$ is $\aleph_0$-codimensional in $(E, \mathcal{T})'$?

Wendy and Stephen gave a positive answer when (E, τ) is separable in one of her last papers 'Dense barrelled subspaces of uncountable codimension' (1989). Her previous paper 'Barrelled spaces and dense vector subspaces' (1988), with Alex and Stephen, invented and applied an attractive splitting theorem subsequently used/refined by Stephen, Ian, and others.

Research on these two papers began when the Robertsons visited Stephen for some weeks at the University of Florida, a collaboration abbreviated by Wendy's retirement in 1989. Her final journal article 'On properly separable quotients of strict (LF) spaces' (1989) introduced properly separable quotients. Stephen combined them with weak barrelledness (*J. Math. Anal. Appl.*, 2016) to solve her paper's primary question. Wendy's thoughtful, gracious, modest reply to Stephen (email, September 2015) mentioned her grandchildren, his singing, and not a word of her growing mathematical legacy.

Wendy and her husband Alex greatly loved travelling. This reflected Wendy's thirst for knowledge, a cosmopolitan view, and a curiosity and interest in the natural world. Often she and Alex travelled to mathematics conferences or to take up visiting teaching or research appointments, for example, in Kansas, Berkeley, Seattle, and Philadelphia. They participated in six of the quadrenniel International Congresses of Mathematicians, the four between 1954 and 1966, and the Helsinki ICM in 1978 and Berkeley ICM in 1986 as part of sabbatical leaves from Australia. In 1969, Wendy took four of the children to India, Nepal, Thailand, Singapore and Hong Kong on the way to the visiting appointment in Perth, with Alex and Lorna following after finishing the term in the UK. In 1973, when the Robertson family emigrated to Australia, Wendy and the three youngest girls (aged 7, 9 and 15) came in advance of Alex and the older children via Greece, Iran and Sri Lanka.

Wendy had an abiding love of classical music. There was always music in the Robertson household. Wendy played the piano and clarinet, and Alex the piano and organ. The family sang in the car on their road trips. Wendy's parents had met through Gilbert and Sullivan operas and her brother, Stanley, became a renowned musicologist. After her retirement Wendy was deeply engaged with music, attending concerts around the world and singing in several choirs.

Sadly, her husband Alex died in early 1995. His death devastated Wendy, but with typical courage and grit, she made herself get out, did voluntary work at the UWA Music Library and elsewhere, and babysat her grandchildren. In 2000, she had a small villa built in Nedlands to her own specifications. She always spent many hours in her gardens, and in her final home she created verges of native flowers and bushes. Although in her 40s when she came to live in Australia, she adopted the landscape and flora of Australia very quickly, always using native plants and learning all their Latin names. She read widely, mainly contemporary fiction, and was fascinated by politics, a member of Greenpeace and a supporter of social justice causes. Earlier in 2016, she was even sending stern emails to the Prime Minister suggesting a more compassionate approach to refugees. In the words of

her children, Wendy "was a remarkable woman of many talents". For example, she loved cricket, was captain of her school's cricket team and played for the Middlesex Women's County Cricket Team. She was a leg-spin bowler and used to say that she was never the best batsman but always the most difficult to get out. Indeed, she was never predictable, always surprising, always independent, and with an indomitable will. She decided she wanted a sports car for her 50th birthday and, thanks to her son Philip, she got a red Sunbeam Alpine. Later, she drove an MGB in British Racing Green.

Wendy was immensely proud of her children, their partners and her grandchildren, and their achievements, personalities and passions. She had a phenomenal memory, especially for numbers and dates, and an eye for detail that few could match. She thoughtfully left some factual information for her children that she thought they would need for her funeral. At the end of the note she wrote: "Most important to me was our family life. Thank you all for everything you and your families have given to me." We thank all of Wendy's children for their invaluable assistance to us in the writing of this tribute.

We thank Wendy for her contributions to mathematics in Australia, her rigorous and inspirational teaching, and her loyalty and generosity as a colleague.

Vale Wendy.

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