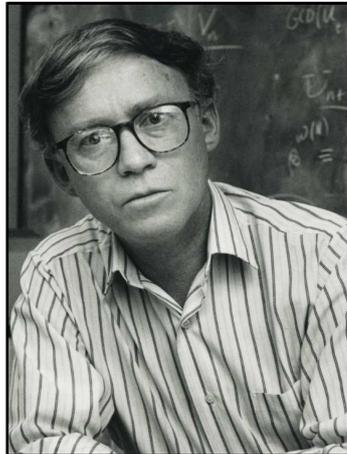# Emeritus Professor Alfred Jacobus (Alf) van der Poorten
16 May 1942 – 9 October 2010

On 9th October 2010, at the young age of 68, Alf van der Poorten died from metastatic lung cancer. He had been ill for two and a half years and endured three operations and several rounds of radiotherapy and chemotherapy, but none of these treatments was able to arrest the progress of his illness. Australia has lost one of its leading pure mathematicians.

Alf was born in Amsterdam in 1942 and spent the war years as 'Fritsje', the youngest child of the Teerink family in Amersfoort. His real parents, David and Marianne van der Poorten, were among the few who returned from the camps. Alf was reunited with them in 1945. His family, including sisters Malieke and Rose, migrated to Sydney aboard the SS Himalaya in early 1951. Eventually the family settled in Bellevue Hill where David van der Poorten became a successful general practitioner.

Alf modestly claimed to have 'survived the ministrations of Sydney Boys High School'. In fact he excelled, and was ranked among the top few students in New South Wales in the Leaving Certificate Examination. After a year in a youth leadership program in Israel, Alf accepted a cadetship in mathematics at the University of New South Wales (UNSW) in 1961.

Alf was a student and then an academic at UNSW for eighteen years. Altogether he collected four degrees from the university. He first graduated in 1965 from a Bachelor of Science degree with Honours in Pure Mathematics. He next completed his doctorate in 1968. Alf avoided the compulsory general studies subjects of the science degree by pursuing a concurrent major sequence in Philosophy, which he later converted to a Bachelor of Arts with Honours. Lest his education be totally impractical, he then proceeded to complete an MBA degree.

During the 1960s Alf was extremely active politically. He was President of the UNSW Students' Union Council from 1964 to 1965 and President of the UNSW University Union from 1965 to 1967. He served on the Council of the University from 1967 to 1973. He was also National President of the Jewish youth movement Betar, President of the Australian Union of Jewish Students and President of the State Zionist Youth Council. In 1966 he received the Australian Youth Citizenship Award 'for his attainments in community service, academic achievement and youth leadership'. Alf joined the Board of Directors of the University Co-operative Bookshop Ltd in 1965 and remained a Director until 1982, serving as Chairman of the Board from 1979.

Alf was interested in all of mathematics but his research was in diverse aspects of number theory. His doctoral supervisor was Kurt Mahler, who was a Professorial Fellow in the Research School of Mathematical Sciences at the Australian National University. Alf's thesis was entitled 'Simultaneous algebraic approximations to functions' and it was in this work that he made his first contributions to transcendence theory. It is no surprise that Alf's second paper was a note on 'Transcendental entire functions mapping every algebraic number field into itself'. At UNSW he was particularly influenced by his teachers John Blatt and George Szekeres.

Alf was appointed Lecturer in Pure Mathematics at UNSW in 1969. I first met him late in 1970, at the time of my appointment, and he was already de facto Head of Department since George Szekeres had no interest in administrative details. Alf was promoted to Senior Lecturer in 1972 and to Associate Professor in 1976.

In 1972 John Loxton joined the department, and over the next decade Alf and John wrote twenty-one joint research papers — all of them serious contributions to number theory. A number of these papers were contributions to Baker's method of linear forms in the logarithms of algebraic numbers and some extended Mahler's method for determining transcendence and algebraic independence. Other papers related to growth of recurrence sequences and algebraic functions satisfying functional equations, and there was a sequence of papers investigating arithmetic properties of certain functions in several variables. They also wrote about regular sequences and automata. The collaboration of Alf van der Poorten and John Loxton was clearly the most important of both their mathematical careers.

During the 1970s Alf spent time on study leave in Leiden, Cambridge (UK) and Kingston (Ontario). His hosts were Robert Tijdeman, Alan Baker and Paulo Ribenboim. He took advantage of this time outside Australia to rapidly build his network of mathematical collaborators. Later sabbatical leave periods took Alf, and often his whole family, to Israel, Bordeaux, Delft, Helsinki and Princeton.

In 1979, Alf was appointed Professor of Mathematics at Macquarie University. He was immediately immersed in administrative duties but still found the time and energy to expand his research output. He served as Head of the School of Mathematics, Physics, Computing and Electronics from 1980 to 1987 and again from 1991 to 1996. Macquarie University was founded only in the 1960s. Alf was asked to increase the research profile of the School, and he succeeded in this through making a number of excellent appointments.

In the periods he was not Head of School, Alf served on the Academic Senate. As Presiding Member of the Academic Senate he was a member of Macquarie University's Senior Executive and an ex-officio member of the University Council until his retirement from administrative activity at the end of 2001. Alf retired from Macquarie in 2002.

An unusual aspect of Alf's research output was the number of his joint authors. Of his publications, 178 have been reviewed by Maths Reviews, and this number will rise over the next couple of years. Once he moved to Macquarie University both Alf's scholarship and his research output rapidly increased with a constant stream of overseas visitors, mainly courtesy of the Australian Research Council. MathSciNet currently lists sixty-five of Alf's co-authors, with the most frequent collaborators being John Loxton, Michel Mendès France and Hugh Williams. The list also includes Enrico Bombieri, Richard Brent, John Coates, Paula Cohen, Bernhard Dwork, K. Inkeri, Sidney Morris, Bernhard Neumann, Jeffery Shallit, Igor Shparlinski, Robert Tijdeman and Michel Waldschmidt.

In a document such as this it is not possible to fully analyse Alf's research output. Perhaps it is best to mention work that Alf believed to be highlights of his research. He certainly considered much of the work with Loxton to be important.

In addition, in 1988 he solved Pisot's conjecture on the Hadamard quotient of two rational functions and he used these ideas to produce a new proof of the celebrated S-unit theorem. In 1992, jointly with Bernie Dwork, he studied the 'Eisenstein constant', providing sharp bounds on the Taylor coefficients of an algebraic power series. Work begun in the early 1980s with Bombieri led to the invariant Thue–Siegel method being applied to the explicit construction of curves with prescribed singularities. Finally, in 1999, Alf and Kenneth Williams succeeded in breaking up the Chowla–Selberg formula, allowing evaluation of the Dedekind eta function for all discriminants in terms of singular values of the L-functions.

Alf always attempted to prove that 'mathematics is beautiful, elegant and fun, a language as worthwhile learning as any other', as he remarked to a reporter in 1979. In part this was done by giving vivid and interesting colloquium talks on five continents. In addition, he put real effort into expository writing. One example of this was in 1978 when 'A proof that Euler missed ... Apéry's proof of the irrationality of $\zeta(3)$' appeared in the first volume of the Mathematical Intelligencer. Apéry was a professor of chemistry whose seminar on this surprising result was very terse and not believed by some mathematicians in the audience. Alf sorted out the details and published a full proof. I heard him give a very successful seminar on this material at Rutgers University in 1978. This talk was given at a dozen departments in the US during the fall of that year. As a second example, his fine book 'Notes on Fermat's Last Theorem' was published by Wiley-Interscience in 1996. Alf claimed that reading it 'required little more than one year of university mathematics and an interest in formulas'. This is not quite true but nevertheless the book was awarded an American Publishers' Award for Excellence in Mathematics.

Alf made significant contributions to the mathematics profession both within Australia and overseas. He was the founding Editor of the Australian Mathematical Society Gazette, served on the Council of the Society for many years and was

President from 1996 to 1998. As President, he worked hard to reduce any remaining tension between pure and applied mathematicians in Australia. During his tenure as president the Council agreed to underwrite the 5th International Congress on Industrial and Applied Mathematics, ICIAM 2003, the first large mathematics congress to be held in Australia. This was an important and visionary undertaking for the Society.

In 1994–1995, Alf chaired a Working Party, with Noel Barton as Executive Officer, on behalf of the National Committee for Mathematics to report on 'Mathematical Sciences Research and Advanced Mathematical Services in Australia'. In 1998 he was a member of the Canadian National Science and Engineering Research Council (NSERC) site visit committee to evaluate Canada's three national Mathematical Sciences Research Institutes; and in 2003 he was a member of the Association of Universities in the Netherlands (VSNU) review committee for academic research in mathematics. In 1998, Alf joined the new Committee on Electronic Information Communication (CEIC) of the International Mathematical Union (IMU), and was reappointed in 2002 and 2006; he was also one of Australia's three delegates to the quadrennial Assembly of the IMU at Dresden (1998), at Beijing (2002), and at Santiago de Compostela (2006).

Alf's contribution to mathematics was recognised by the award of a Doctorate Honoris Causa by the Université Bordeaux I in 1998, for which he was nominated by Michel Mendès France. In his acceptance speech Alf noted that he had visited the department so many times that he considered it to be his third University. In recognition of both his own mathematics and his services to mathematics in Australia, Alf, jointly with Ian Sloan, was awarded the inaugural George Szekeres Medal of the Australian Mathematical Society in 2002. He was also appointed a Member of the Order of Australia (AM) in the Australia Day Honours List 2004, for 'service to mathematical research and education, particularly in the field of number theory'.

Away from mathematics most of Alf's interests were rather sedentary. His writing of mathematics seemed to occur during the ad-breaks in televised football. He watched all the main codes of football as well as cricket, baseball and netball. Above all, he supported the St George Rugby League Football team from the early 1950s onwards. When mathematical inspiration was hard to come by he read science fiction and mysteries. Alf claimed never to have thrown a book away and he thus owned some five thousand science fiction books and several thousand mysteries; but he was 'not a collector, just a keeper'. Since he also owned a couple of thousand mathematics books almost no part of his family home was without bookshelves.

Alf is survived by his mother Marianne, his wife Joy, his children David and Kate, and four grandchildren Elizabeth, James, Gabrielle and Ellie.

On behalf of the mathematical community across Australia I acknowledge our great respect for Alf's achievements. We honour the very substantial contribution Alf van der Poorten has made to mathematics in Australia.

David Hunt, University of New South Wales
E-mail: d.hunt@unsw.edu.au