Andrew Ronald Mitchell

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This special issue is dedicated to the memory of Andrew Ronald Mitchell—Ron to his many friends and acquaintances—who was a significant player in the numerical analysis of partial differential equations throughout most of his professional career.

From a modest beginning as the son of a blacksmith, he gained a scholarship from school at the Morgan Academy in Dundee to study at University College in Dundee, a college of St Andrews University, where he was the only Honours student in mathematics. On graduating with First Class Honours in 1942 he was sent by the Ministry of Labour and National Service as a Scientific Officer at the Ministry of Aircraft Production in London. In early 1946, towards the end of his period of National Service, he wrote to Dan Rutherford, a lecturer in Mathematics and Applied Mathematics at the University of St Andrews with a view to doing a PhD under his supervision. Ron was more than a little surprised with the response—he would be able to study towards a PhD provided that he agreed to become an assistant lecturer in the department.

He had, by this stage, acquired a taste for numerical mathematics and embarked on a thesis entitled "Relaxation Methods in Compressible Flow". These methods had been developed by R. V. Southwell for the iterative solution of finite difference approximations of elliptic problems and Ron was able to resolve the difficulties that had been experienced in transferring them to mixed elliptic/hyperbolic equations. His thesis contains evidence of substantial paper and pencil numerical computations and it is interesting to note that he never personally did any calculations with electronic computers though he had intended to learn to use MATLAB after he retired. He was, of course, adept at interpreting numerical results produced by his colleagues and students.

Throughout the 1950s and early 1960s Ron's publications were mostly concerned with numerical methods for fluid dynamics and heat conduction problems. It was probably his work in the latter half of the 1960s that brought him international recognition. Together with PhD students Graeme Fairweather and Sandy (A. R.) Gourlay, he published a series of influential papers on Alternating Direction Implicit (ADI) methods in which, most notably, they devised high order splittings and dealt with the issue of degradation of accuracy through boundary conditions.

During this period and following a suggestion made by Mike Osborne, Ron hosted in 1965 the first of what was to become a series of very popular international biennial conferences that played a significant role in the development of numerical mathematics. The first two conferences were held in St Andrews and were devoted to differential equations. Later meetings had a much broader theme and became based in Dundee University—which had by then become a university in its own right—where Ron was appointed to

the Chair of Numerical Analysis. The conferences received a boost in 1970 when Ron acquired funding from the Science Research Council for a Numerical Analysis Year at Dundee to which around 40 leading numerical analysts were invited for stays of up to a year.

By this time Ron's research was again taking a new direction—he was in the vanguard of numerical analysts attracted to the finite element method, where his main interest was in the modelling of curved boundaries. This switched in 1975 following a lecture by O.C. Zienkiewicz at MAFELAP II in which the instabilities that resulted in adapting finite element methodologies from structural to fluid mechanics were described. Ron and his colleagues at Dundee came up with with what became known as the Petrov–Galerkin method (a term introduced in a paper he wrote subsequently with Bob Anderssen). This happened so quickly that Zienkiewicz was able to refer to it in his paper in the conference proceedings later that year. This was another fruitful period and led to an interest in solitons and from there on to reaction–diffusion problems where he introduced applications in mathematical biology to a wider audience. This fitted well with the final phase of his career where he made many contributions to the study of nonlinear problems—the "dynamics of numerics", nonlinear instabilities and spurious solutions being among them.

Throughout his career Ron was in constant demand as a conference speaker. His popularity was likely due to a mixture of his down–to–earth style, which could make the most complex topics accessible, and his awareness and appreciation of the issues of the day; he could be counted on to identify new trends and to keep the audience up to speed. He supervised a total of 27 PhD students, many of whom went on to distinguished careers. He had a very warm personality and would give generously of his time. He was always most encouraging to newcomers to the field and would propose promising new areas of research and even accumulate a "starter pack" of relevant papers. His lack of ego and his open mind made him a joy to work with. He also devoted considerable time to the mathematical community and was much sought after for his sound advice. He served on the editorial boards of many journals, most notably that of IMAJNA from its birth in 1981 until after his retirement some ten years later. According to Douglas Jones, who was on the first editorial board of the Journal of the IMA, he was persuaded by Ron over a lunch in the mid–60s that the journal should accept papers in numerical analysis. Eventually there were sufficient papers to start a new journal which led to the creation of IMAJNA.

Away from academe, Ron was an avid sportsman having played semi–professional football for many years and was proficient at tennis, squash and golf (though he claimed to have given it up at an early stage, having lost his ball!). His opening gambit when meeting new people was invariably to inquire about their sporting interests, particularly regarding which football team they supported. He was also known for his love of bad puns, which —as an intensely private man—he would use as a way of deflecting attention from himself.

It is with great honour that we dedicate this special issue to Ron's memory.

—David F. Griffiths and Chus (J. M.) Sanz–Serna