

## CENTREFOLD



### **Dr Graham Weir Head, Applied Mathematics, Industrial Research Limited**

Graham Weir is one of the leading mathematical modellers in New Zealand. He has provided key leadership in the applications of mathematics from within the recently formed (1992) Crown Research Institutes which, being output driven, are not focussed on individual disciplines. Mathematics being often in the role of “consultant to the consultants” it is less visible “in the field”. Yet to those of us who are practitioners know of the strong underpinning and auditing role mathematical science has in strategy determination, decision support etc. As head of one of the largest mathematics groups in the Crown Research Institutes, Graham has been well-placed to foster inter-disciplinary scientific applications in which mathematics plays a significant role.

Our subject of this article is from the University of Canterbury, where he gained an honours degree in physics (1971), a masters degree in mathematics (1974) and a PhD in mathematics under the supervision of Distinguished Alumni Awardee - Professor Roy Kerr in 1977. After this he entered government science, initially in the Department of Scientific and Industrial Research, then onto Industrial Research as a survivor of the difficult restructuring exercise over 1990-2.

Graham’s work has centred on continuum mechanics especially non-standard applications of heat and mass flow. He contributed greatly to the analysis of geothermal phenomena and is a key player in the large exercise led by New Zealanders in understanding this. The problems of multiphase fluid flow are intrinsically hard and he is never daunted by the need to develop new techniques to assist in their analysis. Of course, any good applied mathematician is problem-driven and the toolbox approach means that many different approaches are necessary as different problems come our way. Graham has worked also in corrosion analysis, diffusion in soils, and, with startling success lately, on powder flows. This latter problem with its very non-Newtonian characteristics means completely new frameworks are needed. Attendees of the 1999 New Zealand Mathematics Colloquium were rewarded by a fine general talk on “granular flows” by Graham, where he was the “NZ Branch of ANZIAM invited speaker”. It was one of the highlights of this conference. He and his colleagues were awarded a Marsden fund in this area in 1999.

As I write this in December 1999, I have just received notice that Graham has been successful in the obtaining of a higher earned Doctorate (of Science) at the University of Canterbury. This is for his outstanding contributions in applied mathematics. The citation includes statements like those below.

“Dr Weir’s work [shows] breadth, competence and clarity of his mathematical modelling, especially in the geosciences. In each country with a tradition in applied mathematics there seems to be only a handful of modellers who have the imagination and dedication to take on the daunting modelling challenge posed by most situations involving, loosely, “multiphase flow in porous media”. What has happened in the last decade is that mathematicians are having to work on an expanding stage and address a wider and wider audience and Dr Weir’s research career is a model of the flexibility that is now required”.

Graham is the first higher doctorate graduate in Mathematics at the University of Canterbury and this is a justifiable recognition of his contributions. He is to be capped at the graduation ceremonies in April.

His employers recognise his abilities too. Industrial Research Limited made him one of only four Distinguished Scientists earlier this year and he received a Ministerial Award for Scientific Achievement in 1987. The Royal Society of New Zealand gave him a Bronze Medal in the Science and Technology awards exercise in 1996.

Internationally he is well-known in all these areas (heat and mass flow etc.) and he has contributed to developments in geothermal reservoir engineering in China and Japan.

Colleagues in Industrial Research Limited gain from his missionary role in furthering the role of mathematics in government science. Many summer students have been mentored by him at the beginning of their careers and speak highly of his leadership there.

The last decade has been a difficult one for mathematics in government science. That it has survived, and is now gaining strength, is due in no small way to Graham's steady stewardship and leadership. Combined with his relaxed friendly personality, and the support of his lovely family, Graham is a worthy successor to the tradition of Wooding and McNabb which has helped propel New Zealand Applied Mathematics to a high stature internationally.

We congratulate Graham on his continuing achievements especially the D.Sc from his alma mater.

*Graeme Wake*