

FUNDING FOR COLLABORATIVE AND COOPERATIVE RESEARCH

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The face of Australian research has changed dramatically in recent years. One of the most powerful factors involved has been the political pressure applied to the higher education system principally as a result of the Dawkins initiatives of the latter part of the 1980s. These were aimed at, amongst other things, enhancing the total research capacity of the system, making more efficient use of the resources available and forming closer links between industry, society and academia. The overall result has been that approximately 24 universities and 50 Colleges of Advanced Education, as well as numerous other smaller institutions, were remoulded into about 35 large universities, all competing for the research dollar.

There have also been major changes made to the way in which research funds are made available. While in years gone by, a large proportion of the total funds were distributed through individual researchers, today it is more likely to be distributed through various formal research centres such as the Special Research Centres, Key Research Centres, Cooperative Research Centres and, in engineering, Centres for Engineering Excellence. These centres are, however, not totally funded by the government but require a significant input from industry and commerce. It follows that to be awarded a centre, a great deal of private fund raising is necessary as well as a demonstrated commitment from the private organisations. In other words there has been a shift in funding away from the public sector.

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The universities themselves have become far more corporate in their approach with the formulation of research management plans, the development of research strategies and the identification of research strengths. This has led to a great deal of competition to form groups that may be perceived as research strengths thereby contributing to the overall aims of the university. These groups have often had to be developed from across interdisciplinary boundaries so that resources could be combined to reach the required critical mass to obtain recognition. The boundaries that were crossed were not restricted to just between departments in one institution, but were

often between faculties, campuses and even between institutions. This has led to various other forms of research centre, which just like the formal government backed centres, have been heavily encouraged to seek significant private funding.

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Clearly, then, there has been a distinct move towards greater competition for the funds available for research with preference generally given to those projects which are directly related to industry, as well as having a significant financial commitment from industry. It is not unusual to find funding based on a 50:50 (dollar for dollar) split between government and private funding. It follows that cooperation and collaboration are the buzz words for successful research fund applications.

While the above discussion has been about research funding in general, it is also specifically applicable to geomechanics. It follows that if our technology in its various forms is to continue to develop, the above changes must be accepted and research funding vigorously pursued. However, it must be recognised that it is not just the academic who should be chasing the dollars. With the significant changes in emphasis, the practitioner should now take advantage of the many more opportunities that have become available for making use of the universities' facilities (including staff and students) for research and development. In order to help this process, this article aims to summarise some of the general funding sources that are available for this important work and how they operate. There are many other specific sources of funding which are directed towards a particular part of industry (e.g. the various categories of the Energy Research and Development Corporation). These will not be considered.

The first major source of research finance is through the Department of Industry, Technology and Commerce (DITAC) which has Innovation Support Programs administered by their Industry Research and Development Board. These programs have been specifically developed to make Australian industry more competitive by providing funding for projects that involve technical originality and some risk. These programs include the *Tax Concession for Research and Development Scheme* which involves a tax concession of 150% for money spent on research

and development. An example of this would be a company who wishes to develop some particular form of instrumentation might spend \$50,000 principally on hiring a research engineer. This engineer might work through a university department thereby strengthening the university's research base and its contacts with industry. The 150% means that the tax concession of about 40 cents in the dollar is allowed on \$75,000 (i.e. 1.5 x \$50,000) to give a refund of \$30,000. This means that \$50,000 of research has been carried out at a cost of about \$20,000, or about 40 cents in the dollar. This particular scheme requires a minimum expenditure of \$50,000 to attract the full 150%, although it is understood that there is a sliding scale going from 100% to 150% between \$20,000 and \$50,000. For companies that are unable to benefit from this tax concession, there is also the *Discretionary Grants Scheme* which will provide up to half of eligible costs on projects worth at least \$50,000. Again there are many ways in which this form of project can be assisted through strong contacts with universities.

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Another scheme is the *National Teaching Company Scheme* wherein a company and a university agree to undertake a particular research project, principally at the company's premises. A qualifying company would receive \$40,000 over 2 years towards the graduate researchers salary and the university \$10,000 over 2 years towards academic support costs. This again forms a valuable link between universities and industry. In addition, any funds outlaid by the company may be eligible for the 150% tax concession scheme. There is the *National Procurement Development Program* which basically assists companies to develop research which will be of direct use to a government agency. The company would normally work with the agency to make the product of the research commercially viable. Once this has

been developed, there is no reason why the product cannot then be sold to a wider market. The government agency can take many forms including local government and statutory authorities. Grants of up to half project costs are available with a minimum of at least \$50,000.

The *Advanced Manufacturing Technology Development Program* will provide funds for the development of products, services or systems which will generally benefit Australian industrial competitiveness. Grants of up to half project costs are involved on projects costing more than \$500,000 over a maximum of 3 years. Finally, there is the *Generic Technology Grants Scheme* in which up to 90% of costs will be met by DITAC for commercially driven research and development in certain strategic technologies. The list of these technologies changes from time to time. In previous years, there may have been little to interest geotechnical researchers but it is understood that the latest list includes, in addition to biotechnology, communications technology, information technology and manufacturing and materials technology, waste and environmental management technology. This latter topic may be of some considerable geotechnical interest. There are other schemes available through DITAC including financial support for collaborative research between Australia and certain other countries.

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The other main source of funding is through the Department of Employment, Education and Training (DEET). However, as might be expected, whereas DITAC is very much oriented towards industrial applications and development, DEET is more concerned with matters of an educational nature. The principle source of DEET funding is the Australian Research Council (ARC). The *ARC Large Grants Scheme* provides significant funds for research each

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year. The applications are competitively based and they close around the beginning of the March preceding the year they are awarded. While the scheme does not require complementary funding from industry, there is no doubt that such additional funding would be of some considerable advantage.

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It is normal, however, for a successful application to demonstrate a clear link with industrial practice and the benefits the research will bring. The funds available each year tend to vary and, as always, they never seem to be enough. The current strike rate for these grants seem to be about 1 in 5 or 6, and grants significantly greater than about \$200,000 seem very rare. The *ARC Small Grants Scheme* complements the Large Grants in that they are usually used for pilot studies prior to the development of a Large Grant application. These grants have similar selection criteria, are usually for the duration of 1 year and have values of up to about \$20,000. One of the major problems with the Small Grants is that the funds are only made available at about the same time the applications for the following year's Large Grants are to be submitted. It follows that any pilot study has hardly got off the ground by the time an application for a Large Grant is required. This means that there could be a significant break in continuity unless other sources of funding can be found.

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There are also other forms of research funding directed towards the support of individual rather than specific projects. An important source for support for research students is the *Australian Postgraduate Research Scholarship*, several of which are usually available at all universities. Other more lucrative sources include the *Australian Postdoctoral Fellowships*, *Australian Research Fellowships*, *Queen Elizabeth II Fellowships* and *Australian Senior Research Fellowships*. While in principle all these fellowships are awarded on the basis of applicants' academic records, there can be no doubt that the proposed subject of research must have a major influence on the outcome, if it can be shown that the research is of significance to Australia's wellbeing.

DEET does have 2 important sources of funding that do require direct involvement from industry. One is the *Australian Postgraduate Research Award (Industry)*, for which 100 were available for 1992. Basically, DEET will provide a research scholarship for a suitable student of about \$18,000 p.a. for up to 3 years provided a company will agree to provide an annual commitment to the project for the duration of the scholarship. The minimum commitment is \$5,000 in cash and a further \$5,000 in kind. This seems to be an excellent means of carrying out research directly related to a company's aims for a relatively small outlay. This commitment becomes even smaller when considering that there seems to be scope for tax concessions of various forms, including the 150% concession.

The other is the *Australian Research Fellowship (Industry)*. There are usually about 10 of these available for any one year and for 1993, a pool of \$250,000 has been made available. Basically, the fellowships are for academics to work for between 3 to 12 months on at least a half-time basis, mostly at the industrial workplace. There is no financial commitment necessary from industry, but should there be any, some tax concessions may be available.

The last major source of DEET funding relating to cooperation is the *Research Infrastructure Cooperative Grants (Mechanism C)* scheme. This scheme supports relatively large scale initiatives made by at least 2 higher education institutions acting cooperatively. One of the obvious cases in this category is the funding of centres to form facilities to uniquely service an identified national need or priority. It is critical that the level of cooperation is genuine and not merely superficial, and therefore, any application should go to some lengths to demonstrate this key ingredient. As with many of the other schemes, a clear advantage to industrial and commercial interests must be shown, preferably with some matching funding from these private sources. Indeed over the last couple of years, of the total funds available (over \$12 million p.a.) about half has been allocated for projects involving at least dollar for dollar funds from other sources.

In conclusion, it is clear that there have been some significant changes to the face of Australian research, especially in the way it is perceived, organised and funded. Whilst it would be easy to sit back and bemoan these changes, it is more important that the Australian geomechanics fraternity adjust quickly to ensure that our international standard for research is maintained. There is funding available, but researchers and practitioners must make some considerable effort to agree on how this should be done for everybody's long term benefit.