The ASEG Research Foundation celebrates its 25th anniversary

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Introduction

The Australian Society of Exploration Geophysicists Research Foundation (ASEG RF) has been in existence since 25 September 1989 and to date has supported 115 projects and committed over $1 000 000 to support geophysical students at BSc (Honours), MSc and PhD levels at 13 universities in Australia. The ASEG RF is run by a committee of volunteers from academia, minerals, petroleum, engineering and environmental facets of the exploration geophysical industry. This article describes the origins of the ASEG RF as well as key statistics relating to the foundation's activities. Several recipients of foundation grants tell the story of what the grants have meant to their studies and the paths their careers have taken. Also highlighted are the grant application process and the source of funds and donations as well as committee roles.

Origins of ASEG RF

The birth of the ASEG RF took place over a period of 3 or 4 years following the genesis of the idea in the mind of Bob Smith. Bob canvassed many people's opinions on the original idea and received support from all sides. Additional support was solicited on the squash court. Peter Priest (a colleague of Bob's) was tasked to find the tax implications and effectiveness of such a research institution. Advice on this matter was received from the ATO in April 1987 and guidelines from the CSIRO were provided in May 1987 to assist the ASEG RF in seeking approved research institute (ARI) status.

From December 1987 to February 1988 Bob Smith received several letters of support from key members of the industry, including Keeva Vozoff, Roger Henderson and Jim Cull. In early 1988 the ASEG moved to alter its Articles of Association to allow for the ASEG RF and changes were approved in May 1988. Minutes of the ASEG Executive from 26 October 1988 show that Bob Smith was to be invited to be inaugural Chairman of the Research Foundation. The initial guidelines were developed from the 1987 thoughts of Chairman Bob and are dated 1 August 1988.

During 1989 various activities took place to ensure the legal basis of the ASEG RF, including approval of the altered articles and letters to prominent ASEG members inviting participation. In August 1989 the ASEG Executive approved Peter Priest as Honorary Treasurer of the Foundation. On 22 December 1989 Bob Smith was advised that CSIRO had formally approved the ASEG RF as an ARI. This date could, therefore, be considered the ASEG RF's birthday. Another birthday could be 19 February 1990, when the ATO advised formal approval of ASEG RF as an ARI. The press was informed about the formation of the ASEG RF on 9 March (Figure 1).

On 25 September 1989 the inaugural meeting of the ASEG RF Committee was held. This date is usually considered the official birthday of the ASEG RF, although the first call for grant applications was not made until later in 1990. The meeting was held during the ASEG Conference, at the Hilton Hotel in Melbourne in September 1989. Meetings of the ASEG RF Committee have been held at every ASEG Conference since then. In March 2014 the ASEG RF was approved under the Australian Charities and Not-for-profit Commission, which continued the tax-exempt status of the foundation under a new tax regime.

The ASEG RF Committee established at the first meeting had the following members:

- R. J. Smith (Chair)
- S. Mudge
- N. Hungerford
- J. Denham
- J. Cucuzza

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PRESS RELEASE

The Australian Society of Exploration Geophysicists (ASEG) has formed the ASEG Research Foundation to boost Australian research into exploration geophysics.

Funds are to be raised by donations from individuals, companies and professional societies (eg ASEG) and will be used to support graduate studies in exploration geophysics, primarily at B.Sc. Hons. or M.Sc. level, in Australian tertiary institutions. Mr Bob Smith, Chairman of the Research Foundation, said that this is a level at which funding is difficult to obtain and yet where support is necessary if such research is to continue.

He added that research funds will go directly to support projects in order to maintain applied objectives and hence make them more useful to industry.

The ASEG Research Foundation has recently become an Approved Research Institute, as defined by Income Tax Assessment Act 573A and all donations to the Foundation of $2.00 or more, are now tax deductible.

Some donations have been received already and they will be more actively sought now that tax deductibility is assured.

Mr Smith said, "We anticipate that the leverage obtained in this way will have considerable impact. We aim to attract and keep good students in exploration geophysics and at the same time ensure that they attempt worthwhile and practical research projects of direct interest to industry. Extra funding available through the ASEG Research Foundation should enhance the value of the projects undertaken.

Figure 1. *ASEG press release dated 9 March 1990.*

- P. Gunn
- D. King
- P. Fullagar
- D. Emerson
- S. Hearn
- B. J. Embleton
- E. A. Howell
- D. Boyd
- P. W. Priest

The original Chair was Bob Smith, the Secretary was Joe Cucuzza, and the Honorary Treasurer was Peter Priest. On 4 September 1995 a change took place when Joe Cucuzza became the Chair, Doug Roberts Secretary and Peter Priest Treasurer. Bob Smith continues to serve as a committee member. In 2001 further changes saw Phil Harman become the Chair, Doug Roberts continue as Secretary and Peter Priest as Treasurer. This executive remains in place at present. John Denham has been the Petroleum sub-Committee convenor since inception and Hugh Rutter was Minerals sub-Committee convenor until he sadly passed away earlier this year. In recent years Don Emerson has been the convenor of the Engineering/ Environmental sub-Committee. The full ASEG RF Committee has been very stable with many long-term members. There are still six members from the original list. The ASEG past President is an *ex-officio* member.

Celebrations at the 2013 Conference Dinner. Anti-clockwise from centre: the ASEG Service Medal recipient, Peter Priest; Nick Sheard; Terry Crabb; and Robert Smith.

Currently, however, the committee is searching for new members who are young and enthusiastic. We are looking for volunteers from academia and industry, and from minerals, petroleum and engineering areas.

ASEG RF activities

Table 1 shows the first four projects supported by the ASEG RF in 1991.

Since 1991, 115 projects have been supported by the ASEG RF. The nature of these projects is described in the Figures 2–6.

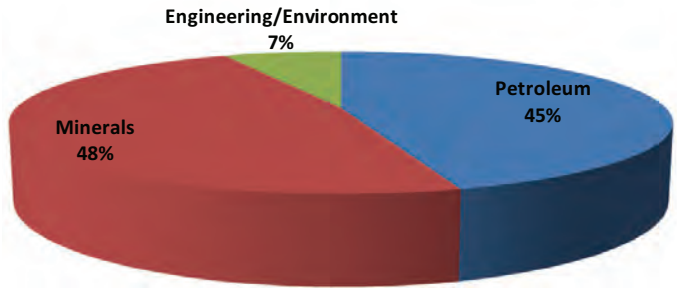

Figure 2. *The percentage of projects supported in each field of geophysics.*

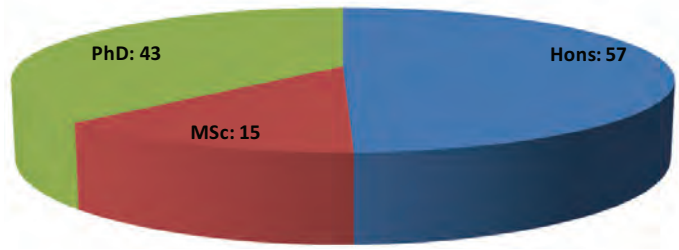

Figure 3. *Number of project supported by degree type.*

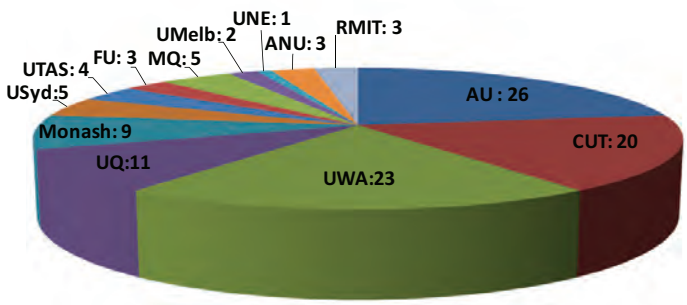

Figure 4. *Number of projects supported by university.*

Table 1. Initial ASEG RF projects

University	Supervisor	Student	Degree	Field	Funding	Years	Topic	Monitor
University of Queensland	Dr S. Hearn	John McMonagle	Hons	P	$4803	1	Combined P wave/S wave seismic reflection for coal	B. Long
University of Western Australia	Dr M. C. Dentith	Kylie Paish/ Michael House	Hons	M	$5000	1	3D structure of the southern greenstone belt WA	G. Street
University of New England	Dr J. M. Stanley	David Boggs	Hons	M	$3987	1	Effects of rock magnetic properties, cultural, and natural HF pulsations and diurnal fluctuations on base station corrections in air mag surveys	S. Mudge
Flinders University	Dr S. A. Greenhalgh	N. Sikes	MSc	P	$3460	1	Imaging of subsurface faults by walkaway VSP waveguiding – physical model experiments	P. Fullagar

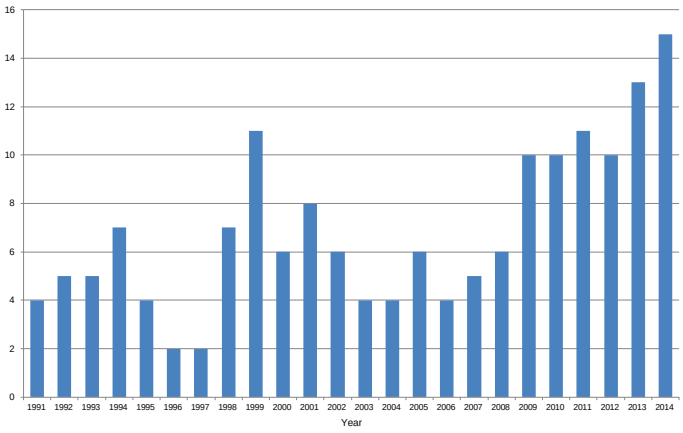

Figure 5. *Number of projects supported each year.*

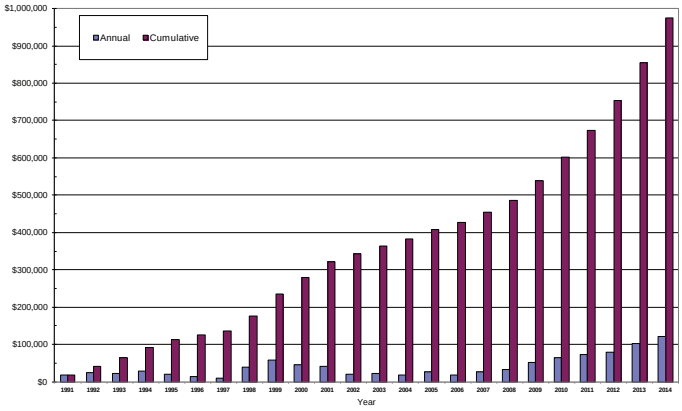

Figure 6. *Funding levels year by year since 1991.*

Past project reminiscences

The ASEG RF Committee asked several past recipients of ASEG RF grants (Table 2) to describe how the grant helped in their studies and also the paths their careers have taken. Many of the students are now well known in the wider ASEG community.

Natasha Hendrick 1993 and 1999

I was first awarded an ASEG RF grant to undertake my Honours year in 1993, in Exploration Geophysics at the University of Queensland. My research project looked at seismic inversion and the impact of assumptions made around spectral extension practices to accommodate missing frequencies in our seismic data. Most importantly, the grant helped fund the University of Queensland geophysics lab, including the computing facilities that I required to conduct my research, and enabled me to attend my first ASEG conference to present my work (and I haven't missed an ASEG conference since!). I am extremely grateful that the grant helped support me through my Honours year so that all of my time could be spent on geophysics (I actually really enjoy my field of work!).

A number of years later, I was privileged to receive an additional grant from the ASEG RF to help cover expenses towards the end of my PhD in multi-component seismic vector processing. A challenging topic … I had out-studied my original PhD scholarship and the awarding of an ASEG grant meant I had the time to finish the research properly. I have applied the learnings from this research in a number of geophysical roles since – including application to onshore, offshore and ocean-floor multi-component seismic data. In 2003 I was awarded the ASEG Laric Hawkins Award (most innovative use of a geophysical technique) for a paper I presented at the ASEG Conference on my PhD research.

Since completing my PhD I have worked in various technical, research, management, training and marketing roles with Digicon Geophysical, MIM Exploration, Velseis, PGS and DownUnder GeoSolutions. My research roles have seen me work with engineers, mathematicians, geologists and geophysicists around the world on broadband seismic solutions, 4D seismic for reservoir monitoring, a multi-component fibre optic seafloor acquisition system, converted-wave imaging, vector processing and finite-difference modelling. These days I'm working as a geophysicist at Santos – providing geophysical support for exploration and development projects, including conventional oil and gas, and shale gas exploration, and managing our Carnarvon and Ceduna Basin Exploration assets.

Table 2. Recipients of ASEG RF grants invited to reminisce about their experience

Year	University	Supervisor	Student	Degree	Field	Funding	Years	Topic
2007	University of Adelaide	Dr Graham Heinson	Michael Hatch	PhD	E	$5037	1	Geophysical interpretation of temporal variations of surface and groundwater hydrology
2002	University of Adelaide	Professor Stewart Greenhalgh	Phillip Heath	Hons	M	$2200	1	A theoretical and numerical study of potential field gradient methods for exploration beneath cover
1999	University of Queensland	Dr Steve Hearn	Natasha Hendrick	PhD	P	$6700	1	Applications of multi-component processing in exploration seismology
1995	University Tasmania	Dr D. E. Leaman/ Dr Michael Roach	Nick Direen	Hons	M	$4790	1	Structure of the Longford Basin, Northern Tasmania
1994	NCPGG	A. Mitchell	Ralph Weiss	MSc	P	$4940	1	An analysis of velocities within the Lake Hope 3D seismic survey area
1994	University of Adelaide	Dr R. Hillis	Shane Squires	Hons	P	$5000	1	Seismic shear wave anisotropy experiment
1993	University of Queensland	Dr Steve Hearn	Natasha Hendrick	Hons	P	$4800	1	Evaluation of seismic trace inversion in the Surat Basin, Qld

Shane Squire 1994

The ASEG RF grant provided funding for field experiments to observe and record shear-wave anisotropy using a (sledge) hammer-induced seismic source, in an area where fractures were known to exist in the shallow sub-surface. We had a large railway sleeper (~2 ft × 1 ft × 1 ft) engineered to be encased in 1 cm metal plates, and had two ~2 ft (1 inch thick) nails driven through the block so they protruded ~1 ft to allow better coupling with the ground. This acted as our source plate/block for generating hammer-induced p-waves (via a vertical strike) or s-waves (horizontal strike), the energy from which was then recorded along a short 2D array of surface geophones.

I joined Santos in 1995 and have built an extensive 19 year career involving portfolio risk analysis, seismic interpretation in exploration and appraisal, both onshore and offshore, and most recently rock physics, seismic inversion, AVO modelling and analysis and geostatistics. My current role as a Staff Geophysicist with the Quantitative Interpretation Group is focussed on providing high-end geophysical support to Santos.

Ralph Weiss 1994

Ralph Weiss with daughter Beth.

In February 1993 I returned home to Adelaide after a 6 year sojourn working throughout Southern Africa, newly married, with some savings and a slot in the Adelaide University, National Centre for Petroleum Geology and Geophysics (NCPGG) MSc program (now the Australian School of Petroleum). Prior to leaving Australia I had been accepted for this program but deferred, the lure of adventure and excitement in Africa too great to resist. On my return and now a 'mature age' student at the grand old age of 31, married and with almost 10 years' work experience under my belt, I was definitely the old man of my cohort. Nevertheless, I enjoyed the return to student life and diligently applied myself to my studies (first year was coursework only) and emerged at the end of first year with very good results. Fortunately! Giving up a very good, exciting and well-paid job to resume a poverty-stricken student existence was not a huge selling point for my translocated wife. As I finished my first year and started work on the project part of the MSc program it became apparent that even with my wife's earnings and a very frugal lifestyle, we were slowly working our way through dwindling savings and faced the very real prospect of running out of money before I completed my thesis.

So, with cap in hand, I approached both Bill Stuart, the director of the NCPGG at the time, and the ASEG, and received a grant from both. These grants helped us tremendously and enabled us to keep our head above water and the bailiffs from the door. Just when my thesis was mostly complete, my wife and I found ourselves pregnant with our first child. With my wife soon to be unable to work and our savings almost depleted, I hastily started looking for work and in the mid-1990s slump could not find any work in petroleum geology and geophysics. I managed to secure work in minerals exploration and spent the next 2 years searching for diamonds in the remote Kimberley.

Unfortunately with a new job, new baby (Beth) and lots of field work I missed my submission deadline and hence failed to complete my MSc, something that I regretted strongly at the time. However, on a positive note I did learn a tremendous amount at the NCPGG and now, with the benefit of hindsight and the wisdom of age, I view my experience at the NCPGG much more philosophically – learning for learning's sake. My education there ultimately enabled me to gain employment in the petroleum side of the geology and geophysics industry.

In 1998 after having flipped between mineral and oil exploration a number of times, I finally leapt across to the petroleum sector for the last time, working for an oil services contractor in Perth. This ultimately led to my current job with Woodside where I have been for the past 14 years. So now, at the other end of my career, with three children (with my first child herself now at university) and still married to my now naturalised Australian wife, it is interesting to look back all those years to my enjoyable student (oh the benefits of rose-tinted hindsight!) days at the NCPGG. Undoubtedly the education I received gave me the confidence and theoretical background needed to progress within the petroleum geology and geophysics industry. I have been very fortunate to have worked for some great companies on truly amazing projects, both locally and internationally, and for this I will always be grateful for the wonderful support I received from both the NCPGG and ASEG RF.

Nick Direen 1995

Being a recipient of an ASEG RF grant in 1995 was of great benefit to me in two distinct ways. Practically, it funded the costs of my 3–4 months of gravity and magnetic fieldwork, involving numerous extended trips to the Longford Basin in northern Tasmania. It funded food, fuel and accommodation away from home, freight of samples and instruments (I had borrowed a SIROTEM from the mainland), and practical costs like buying survey maps, geology reports, making thin sections and sample slabs – and printing hardcopy of everything in the days just before lots of data was available online! Intangibly,

there were benefits too: I was assigned an industry mentor for the project, John Bishop, who gave friendly input in addition to that of my two Honours advisors, David Leaman and Michael Roach. The prestige and recognition of the award was also useful when I was negotiating access to data from third parties like (then) World Geoscience, who had flown airborne EM and magnetics over part of my field area; I remember speaking on the phone to Greg Street in Perth and mentioning the fact I had an ASEG RF funded project ... his collaboration was forthcoming! ASEG support also led to further good outcomes: my poster reporting the results at Sydney ASEG 1996 with David Leaman was awarded Best Poster paper of the conference, and was subsequently published in *Exploration Geophysics* in 1997 – along with a companion paper on the electromagnetics/rock physics study, co-authored with Michael Roach. These group achievements were also a welcome boost for the profile of geophysics within the Geology Department/CODES at the University of Tasmania, which at the time (like many small geophysics research groups) was under some pressures (see my article in *Preview* **68**, 1997, as well as that by Derecke Palmer in the same edition, and Norm Uren, *Preview* **63**, 1996).

In my subsequent career, I've been fortunate to be able to continue my applied research interests which started with my ASEG RF grant. From 1996 to 1999 I completed a PhD, applying gravity, magnetics and electrical/MT studies to the Koonenberry Belt, sponsored by AGSO and Mineral Resources NSW. I was then employed at AGSO from 1999 to 2002 as a Research Scientist, working first in the National Gravimetry project, then in regional geophysical mapping of the Lachlan Foldbelt and Gawler Craton, and the offshore Australian Antarctic Territory. During this time I served as Secretary then President of the ACT ASEG. In 2002, I took up a tenured position teaching Exploration Geophysics at the University of Adelaide, supervising several Honours and PhD students in geophysics – many of whom also had their research published internationally, and who have gone on to careers in industry and government. I also served on the SA ASEG committee. In 2006 I joined resource consulting firm FrOG Tech, based first in Adelaide then Hobart, consulting to the oil and minerals industry in over 20 countries, including undertaking fieldwork in many of them. During this period I maintained adjunct research positions at University of Adelaide (until 2011) and University of Tasmania (ongoing), publishing many pieces of applied geophysical research and, with co-workers such as Anya Reading, attracting valuable ARC Linkage and private funds for geophysical research, as well as co-supervising more geophysics graduate students. In 2013, I joined ExxonMobil Exploration in Houston, where I am part of the Gravity, EM and Magnetics Centre of Expertise – with oversight over all of ExxonMobil and affiliate company potential fields and EM acquisition, technology development and interpretation worldwide.

A closing thought, verbatim from my 1997 *Preview* article:

> *With the demand for well-trained geophysicists almost certain to increase in future, because of the desire to probe the third dimension beneath us, we should also be sure that there will be government entities and companies who are prepared to 'put in' to assist in training the geophysicists of the future.*

It was true in 1995. Let's keep it true in 2015; support the ASEG Research Foundation: it *does* make a difference.

Philip Heath 2002

I received a grant from the ASEG RF in 2002 to assist in my Honours project at the University of Adelaide. The project involved a study of inversion techniques for potential field data. The research grant allowed purchase of valuable software and texts for the study. After completing Honours, I continued with study at Adelaide, completing a PhD in 2007. I then worked for Canadian Micro Gravity as an operational and processing geophysicist for their airborne gravity system, travelling globally. I am now working with the Geological Survey of South Australia as a senior geophysicist, and am an active ASEG member and volunteer.

Mike Hatch 2007

I was awarded an ASEG RF grant in 2007 to evaluate the performance of various soil probes designed to log variation in soil conductivity and moisture content over time. The intention was to determine which probe would be the most suitable to use at various study sites in the Murray River floodplain environment to correlate with near-surface geophysical surveys that we were running to map salinity distribution and geological variation on the floodplain. The study tested probe performance in the lab over a range of conditions over the period of a few months. Interestingly, while all worked well under relatively resistive conditions, none proved suitable for use in the often saline conditions that we encountered in our study areas. Even though this study 'failed', it was still a useful part of my research at that time. Since the completion of my PhD I have had the opportunity to continue my research career, including more work on the Murray, as well as another project to measure and map greenhouse gas concentrations in various settings around eastern and central Australia. Recently I was part of a group that completed a smaller but still interesting project funded by the SEG Geoscientists without Borders program to use ground-penetrating radar to locate wombat burrows in western South Australia.

Projects 2014

The following seven projects were supported in 2014 from 10 applications (Table 3).

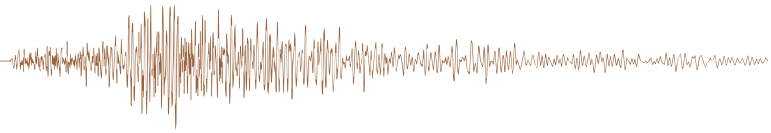

Table 3. 2014 supported projects

University	Supervisor	Student	Degree	Field	Funding	Years	Topic
Australian National University	Dr Eva Papp	Sanjay Govindan	BSc	M	$5000	1	Developing a direct current-based geoelectrical method to estimate the depth of aeolian cover over the Dargues Reef gold deposit and surrounding area
University of Adelaide	Professor Graham Heinson	Michael Stepan	BSc	M	$5000	1	Magnetotelluric imaging of the Delamerian–Lachlan transition, western Victoria
Curtin University	Dr Anton Kepic	Maria Cornelia Kitzig	PhD	M	$10 000 $10 000 $10 000	3	Integration of down-hole geophysics and geochemistry for geological characterisation
University of Western Australia	Professor Mike Dentith/ Associate Professor Alan Aitkin	Sasha Banaszczyk	PhD	P	$4000 $8000 $9500	3	Regional-scale interpretation of airborne electromagnetic and magnetotelluric data: workflow and application to exploration in sedimentary basins
University of Adelaide	Dr Simon Holford	Alexander Robson	PhD	P	$9500 $9500 $10 000	3	Structural and geomechanical evolution of the Ceduna Delta, Bight Basin, Australia
University of Adelaide	Dr Simon Holford	Fun Julie Ellen Meeuws	PhD	P	$8400 $9200 $7600	3	Understanding the impacts of magmatism on hydrocarbon prospectivity along the southern Australian margin through the integration of geophysical, geochronological and geochemical methods
University of Western Australia	Associate Professor Jeffrey Shragge	Benjamin Witten	PhD	P	$10 000 $10 000 $10 000	3	Elastic parameter estimation using 3D image-domain adjoint-state tomographic inversion of passive seismic wavefields

ASEG RF grant application process

In early December each year applications are solicited from tertiary institutions by circulation of a poster with the relevant details. Applications close near the end of February. After closing, the applications are studied by one of three sub-Committees of the ASEG RF: Minerals; Petroleum; and Engineering/Environmental. After ranking and recommendations, the availability of funding determines which projects can be supported. The guidelines below apply to successful grants.

Guidelines summary

Funds will be granted in support of research projects at BSc (Honours), MSc and PhD levels carried out in an Australian tertiary institution. Grants will be made to projects rather than people. That is, they will not be 'scholarships'. For BSc (Honours) and MSc projects, annual grants of up to $5000 will be made to the tertiary body responsible for the project. Grants of up to $10 000 per annum will be made for PhD projects. The funds are to be used in support of the project, e.g. for travel costs or rental of equipment. Funds must be accounted for and, if not used, should be returned to the ASEG RF.

The project supervisor will be responsible for drawing the funds as required and for managing the expenditure. He or she should ensure that a research report and financial reconciliation is provided to the ASEG RF on completion (or cessation) of the project. On the completion of the project, all results must be available in the public domain. Projects will be selected by the relevant ASEG RF sub-Committee. They will select projects in applied geophysics with an emphasis on practical or applied research.

On completion of the project, an abstract will be published in *Preview* and publication as a paper must first be submitted to *Exploration Geophysics*. The supervisor would normally be expected to be a co-author and will be responsible for submission of a publication.

Interim progress reports will be required and should be forwarded to the Chairman/Secretary of the ASEG RF. For each project, an industry monitor will be appointed, who should be a member of the ASEG (but not necessarily of the ASEG RF Committee), and who will monitor the progress of the project and report to the Committee. This would involve at least one and preferably more visits to the institution where the project is being carried out.

Members of the ASEG RF Committee will be responsible for checking the final report from each project. Copies of the report (e.g. thesis) will be available to any interested members, on request. It is expected that the student undertaking the project will be a student member of the ASEG.

Details of the application process can be found on the ASEG website at https://aseg.org.au/RF-application.

Source of funds and donations

The ASEG RF can only carry on its work because of generous donations from individuals and companies. The ASEG has provided the most significant contributions in the past few years and we hope it will continue to do so in the future. We want to encourage individual ASEG members, companies and other institutions with an interest in exploration geophysics to make a donation to the ASEG RF. A portion of corporate membership fees is allocated to the ASEG RF and a larger amount from Corporate Plus members (currently Velseis), and we encourage annual contributions from companies, institutions and individuals. All contributions are fully acknowledged in *Preview*. Furthermore, since the ASEG RF is an ARI, all contributions are fully tax deductible. The foundation is also exempt from GST obligations.

ASEG RF Committee – volunteers wanted!

ASEG members from minerals, engineering and petroleum areas, as well as from academia, serve on an honorary basis on the

ASEG RF Committee (Table 4). All administrative costs are borne by the Committee members themselves and no ASEG RF funds are used for operating expenses. Phillip Harman is the current Chairman of the Foundation. Doug Roberts is the current Secretary and Peter Priest is the Honorary Treasurer.

Phillip Harman

The ASEG RF is regularly looking for keen and enthusiastic new members with an interest in supporting university students and research into exploration geophysics. We are especially keen for volunteers from the petroleum industry at present. Please contact members of the Committee to find out how to get involved.

Table 4. Current ASEG RF Committee

Name	Company	Position/sub-Committee
Bourne, Barry	Terra Resources	Minerals
Clifton, Roger	NT Geological Survey	Minerals
Denham, John	Consultant	Petroleum (convenor)
Dentith, Mike	University of WA, Department of Geology and Geophysics	Academic
Emerson, Don	Systems Exploration (NSW)	Engineering/ Environmental (convenor)
Golden, Howard	Rio Tinto	Minerals
Greenhalgh, Stewart	University of Adelaide	Academic
Harman, Phil	Stellar Resources	Chairman
Hearn, Steve	University of Queensland, Department of Earth Sciences	Academic
Heinson, Graham	University of Adelaide	Academic
Long, Andrew	PGS	Petroleum
Mudge, Stephen	Vector Research	Minerals
Priest, Peter	Chartered Accountant	Treasurer
Roberts, Doug	Beach Energy	Secretary
Rutter, Hugh (passed away in June 2014)	Consultant	Minerals (convenor)
Smith, Bob	Consultant	Minerals
Williams, Peter	Consultant	Minerals
Lisa Vella	Southern Geoscience Consultants	Minerals
Julian Vrbancich	DSTS	Minerals/ Environmental

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