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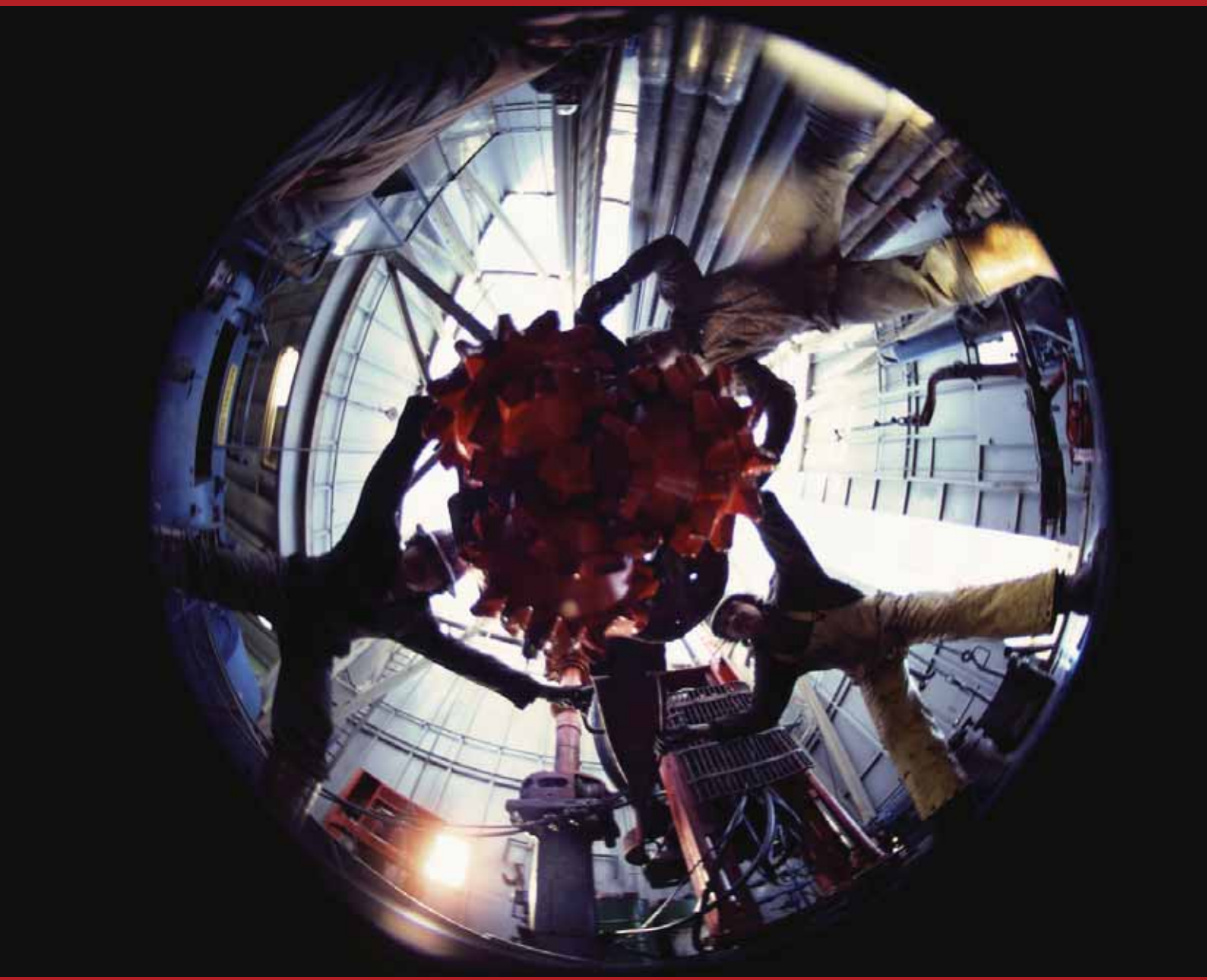
CSIRO EARTH SCIENCE AND RESOURCE ENGINEERING



Smarter drilling

Leading a drive to excelle


DARRYL PERONI

Division's new Science Leader, **Dr Michael Glinsky**, talks QI, BHP, CESRE, R&D and how Australia's minerals and petroleum science is the 'best in the world'

What are the Science Leader's chief objectives?

In brief, it is articulating scientific vision and leading the achievement of that vision. We must remember that the vision is that of the organisation, not the leader. A vision is a common view of the future. One good thing about the selection process was the submission of statements by both myself and the division of the vision for this role, and the requirement to align these two statements. Practically, I will be putting together a group of postdocs and graduate students. Along with other researchers who are drawn to the shared vision, we will supervise and mentor the young talent and all contribute to the achievement of CSIRO's R&D goals. It will also be critical that the vision is shared by other important stakeholders such as the Australian Government and industry partners.

Please expand on that scientific vision

I have had a strong view for most of my career that geophysics is the physics of geology, a fact that is often lost as applied geophysicists in industry go about the day-to-day tasks of making sure data is acquired and processed correctly. It is further blurred by education that practically trains a geophysical 'chef' to create processed data pleasant to the eye. In contrast, we want to ensure that "physics meets geology": physical processes that create geology and the relationships between physical measurements of geological structures and geology must both be fundamentally understood. A key ingredient of this understanding is uncertainty; a measurement is meaningless without its error. This uncertainty is critical to knowing how to combine multiple physical measurements and to understanding the business risk and uncertainty.

How does this equate to the value of R&D?

The value of the R&D comes though influencing decisions on how resources should be extracted. The plans should have enough flexibility to respond efficiently to what could happen but not to permit expensive flexibility to respond to what cannot happen. A requirement of understanding the uncertainty is to examine many possible outcomes; this requirement and the complexity of some physical models demands high-performance computing such as that being installed next to ARRC in Perth.

How does your new role complement the newly merged CESRE division?

I look to lead the discovery of the geophysical links between the parts (mining and petroleum) that form the new merged division. This is essential if we are to realise and capitalise on the breakthroughs that come from such combinations.

How much time will you spend in the field, at the 'coalface' so to speak?

The coalface for theoretical and computational physicists is paper and pencil (and computers of course). The new super-computer centre being constructed in WA is the ultimate coalface. That being said, I also have a strong interest in exploring the newer social networking and multimedia technologies such as Twitter, SmartBoards, LinkedIn and Wikis. There is still significant unexplored potential for impact in the ways scientists interact. I also feel that it is very important to visit the mine sites, geologic outcrops, seismic and electric and magnetic (E&M) acquisition boats [ships that acquire marine seismic and controlled source marine electromagnetic data] and petroleum production facilities. It helps to make the theory and simulations tangible and it inspires R&D.

Are you confident that scientists, industry and government in Australia are fully aware of the fight needed to win back exploration supremacy?

Being new to the organisation and a relatively new arrival to Australia from the US, it is hard for me to comment what may be on the mind of scientists and politicians but I do sense that scientists here are committed to scientific quality with an eye to the commercial application. This is one of the things that

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attracted me to CSIRO. Also, the Australian Government has a significant and long-standing commitment to funding petroleum and mining R&D and I see it as my job to help ensure the maximum impact of this funding on exploration and development.

If you were briefing the Prime Minister tomorrow on the issue of exploration supremacy how would you sum up the situation?

I have always been bullish on the undiscovered potential in Australia. The challenge is to make sure that we have the methodologies (the resource assessment and optimisation technologies) to do it in a broad and efficient manner to maximise the wealth and longevity for Australia.

I harken back to a discussion that I had with another US scientist in the gardens in front of the Melbourne Museum. We were on the way back to the US from teaching a course in Perth for BHP Billiton where we had been briefed on the state of petroleum exploration in WA. My colleague had more than 30 years of experience working for Shell. When describing Australia he said he did "not know that such areas still existed with such unexplored scope and potential".

What do you see as the most important scientific elements/disciplines key to discovering new mineral and oil deposits?

We have limited resources to deploy in finding, appraising and developing new deposits so it is imperative that there are good methodologies to 'triage' the opportunities and efficiently assess and constrain the range of resources. It is key that we have the ability to combine different remote and drill-hole measurements (including physical constraints on the geology) to give us the risk and uncertainty. The same methodologies can be extended to recommend the next set of data to acquire that will have the most beneficial value-cost ratio.

There is much talk of 'peak oil'. What's your view?

We will not know for sure that we have reached peak oil production until we see a definitive and sustained decline in worldwide production. Improvement in the exploration and extraction technology is part of the curve and acts to delay the onset of Peak Oil ... but I feel that it will come. It could be argued that we have reached that point with the recent sustained price increases and a flattening production profile. It is not certain but time will tell. It is research into reasonable cost and environmentally friendly alternatives that will provide the long-term solution.

What's your broad overview of Australian minerals and petroleum science?

My view is that it is the best in the world - another factor that attracted me to this position. Australians have a can-do attitude and a willingness and ability to implement advanced solutions. When I worked for Shell R&D it was Woodside who were the first adopters of the technologies and it was Australian expats who were the first adopters within Shell. That continued with my tenure at BHP Billiton. There was a quantitative approach to petroleum risking and resource uncertainty estimation that was developed, in conjunction with CSIRO. It is now the standard employed by many Australia-based companies. It is much less adopted in other countries.

Briefly explain "quantitative seismic interpretation" and say which elements of minerals and petroleum exploration and extraction this discipline benefits most?

Quantitative Interpretation (or QI for short) is a term that I like to use for the way that interpretation should be done. This is in contrast to qualitative interpretation. I refer back to the 'geophysical chef' in my response to the second question. As much as possible the interpreter should try to quantify statements that are made. Instead of saying "this looks like gas, from my experience", statements should be made such as "gas is the only thing that has a response between 1 and 2, and we have observed 1.5, therefore there is a 80 per cent probability that there is gas". In other words, instead of saying "this tastes good", say something like "this has 15 per cent sugar content, which 80 per cent of the population prefers".

Finally, on a more personal note, what do you hope to gain from your new role professionally and personally?

I am looking forward to being a part of the Australian academic community, publishing and mentoring the next generation of Australian scientists.

Dr Michael Edwin Glinsky

EDUCATION

1983	B.S. (Highest Honors, Physics), Case Western Reserve University, US
1991	Ph.D. (Physics), University of California at San Diego, US
2001	Executive Education (Corporate Finance, Advanced Options) University of Chicago GSB, US

CAREER

1982, 1985; 1991-1997	Business Development, Lawrence Livermore National Laboratory, US. Also performed Theoretical and Computational Laser-Biological Tissue Research, Seismic Processing Research, Theoretical and Computational Inertial Confinement Fusion Research and Experimental X-ray Research.
1983-1985	Exploration Geophysicist and Senior Research Physicist, Shell International E&P
1997-1999; 2000 - 2008	Section Leader, Quantitative Interpretation & Global Quantitative Interpretation Specialist, BHP Billiton Petroleum. Also, Section Leader, Global Geoscience Technology
2008 – 2010	Manager, Resource R&D, BHP Billiton

PROFESSIONAL AFFILIATIONS AND APPOINTMENTS

- American Physical Society
- CSIRO Medal for Research Achievement (reservoir characterisation)
- LLNL Award for Outstanding Scientific Publication, 1994
- Simon Ramo Award (outstanding doctoral thesis in plasma physics, American Physical Society)
- Department of Energy Distinguished Postdoctoral Fellowship
- National Science Foundation Graduate Fellowship

INTERESTS

Bicycle racing
Swimming and running
Cross-country skiing
French culture and language