

## Earth Science Education in South Australia: Evolving with the Resources Boom

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In recognition of the increasing importance of earth science issues in the community, Earth science education in South Australia has changed dramatically over the last few years. New courses and curricula have been created at the SA universities to offer tertiary education that addresses the needs of the community and industry. In geology and geophysics at the University of Adelaide the educational refurbishment has led to a remarkable increase in student numbers in geosciences and mining engineering—just in time for a booming minerals industry.

“Since 2002, we have made a strong and directed learning and teaching effort with a new team and we are seeing the results in our graduate numbers”, said, Dr Karin Barovich geology and geophysics undergraduate coordinator at the University of Adelaide, “Current geoscience courses have set the benchmark for student enrolment in Australia well ahead of the players from the big universities in Melbourne and Sydney.” This industry needs qualified staff to sustain the impressive growth of the last years—



*Studying Geology at the University of Adelaide – educating for the needs of community and industry*

the tertiary education providers of South Australia are ready to meet this demand offering a spectrum of geoscience, geo-engineering and geo-technical career pathways. Students can choose from the following courses:

- The University of South Australia offers a Bachelor of Applied Science Honours degree as well as Masters and PhD programs in geology.



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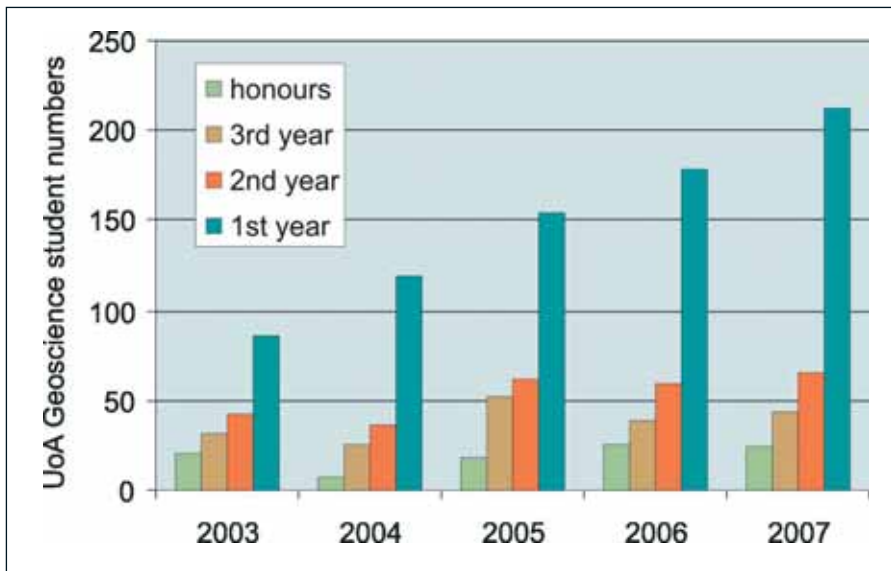
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- The Ian Wark Research Institute offers Masters and PhD programs in the Mineral Processing sector of Applied Science and Engineering.
- Flinders University offers a Bachelor of Science in Earth Sciences with an emphasis on environmental and hydrogeological aspects (but does not maintain a separate course in Geology).
- The TAFE institute of South Australia maintains training courses for mine workers and mining and exploration technicians to meet the needs of the minerals industry.



Development of student enrolment in geoscience courses at the University of Adelaide of the past five years

The University of Adelaide has been building steadily building its portfolio of resources related undergraduate and postgraduate courses, and now offers the following:

- BSc programs in Geology, Geophysics and Environmental Geoscience
- BSc Honours degrees in both geology and geophysics
- BSc in Petroleum Geoscience
- BSc Honours in Petroleum Geology and Geophysics at the Australian School of Petroleum
- BE (Petroleum), and BE (Chemical) with an option for mineral processing at the Australian School of Petroleum

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- BE (Mining) commencing this year
- PhD and Masters programs in Geology and Geophysics
- PhD and Masters programs in Petroleum Geoscience and Engineering

At the University of Adelaide ('UoA') the past four years have seen a dynamic expansion in geoscience courses relevant to the minerals and petroleum industry. Seven new appointments and 18 new externally funded staff in geology and geophysics over the last six years have built the group into one of the most research-active in the country. The new appointments in economic geology, sedimentology, structural geology and regolith geology ensure that UoA can meet the increasing demand for tertiary geoscience education, and that students receive a first-class education from highly-motivated research active staff.

All geoscience courses at the UoA have a strong field work orientation with education 'on the rocks' during field- and mapping camps to Kangaroo Island, Central Australia and the Delamerian Orogen and excursions to mine sites in South Australia, following the idea of "a good geologist is one who has seen a lot of rocks!". It's this field experience that brings out the best in the students and develops the 'soft skills', the teamwork/collaboration ability, problem-solving skills, dependability, leadership qualities and critical thinking.

Research in the discipline of geology and geophysics at UoA is organised into four main groups:

The Centre for Mineral Exploration Under Cover (CMXUC) is chaired by Prof David Giles and supported by the South Australian government through its PACE program. The centre has four dedicated research staff and as well as undertaking targeted research projects themselves, they strategically link the mineral exploration research components carried out by the other research groups.

The Cooperative Research Centre for Landscape Environments and Mineral Exploration (CRC LEME) investigates the link between landscape evolution and mineral deposit formation. The UoA is the largest post-graduate educator in the CRC and regolith geoscience forms a core component of the undergraduate programme. In 2007 the UoA employed Dr Steve Hill as the only continuing staff position in 'Regolith Geoscience' in the country.

The Continental Evolution Research Group (CERG) is committed to fundamental and applied research in tectonic systems and has a portfolio of funded Australian Research Council and other grants to undertake research into specific tectonic problems in Australia, Tanzania, India, Antarctica, USA, Spain and China.

The metals and solutions group is based on research links with the mineralogy research team at the South Australian Museum. This group works on the fundamental forefront of mineralogical science and its application. Research foci are the conditions of sulphide formation and the mineralogy of uranium minerals.

The Australian School of Petroleum (ASP) at UoA has been a major development. ASP is the result of a merger of between the National Centre for Petroleum Geology and Geophysics (NCPGG—Australia's only petroleum geoscience graduate school) and the Santos-funded School of Petroleum Engineering. The ASP retains its graduate petroleum geoscience school and also hosts the Bachelor of Engineering (Petroleum) as well as Masters and PhD programs. Both domestic and international student numbers are very strong at the ASP, with around 50 first year Bachelor of Engineering (Petroleum) students in 2007. The School has been very successful in attracting students from SE Asia and the Middle East. The ASP is a partner in the CO<sub>2</sub> CRC, with a large group working on the geological sequestration of CO<sub>2</sub>. The School runs many industry-funded research programs with major support from companies such as Santos and Exxon, and strong support from the SA Government Department of Primary Industries and Resources (PIRSA).

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# Bright future.





*Geology and geophysics at the University of Adelaide. Geoscience has a strong emphasis on off-campus education. Here students are returning from their first underground experience at Olympic Dam*

2006 also saw the set up of the new Bachelor of Engineering (Mining) course coordinated by UoA Professor Ian Plimer in order to address the skills shortage in Australia's principal export industry and the growth in exploration and mining in South Australia. This program has strong government, university and industry support. The university has already made staff appointments to teach the 60 students enrolled in the course—half of these students will receive an industry-sponsored bursary. The course is a four year course with two years of engineering including some mining and geoscience subjects, followed by two years exclusively of mining engineering studies.

We believe that with vibrant undergraduate and postgraduate programs in geology and geophysics and petroleum engineering and the nascent mining engineering degree, in addition to research strength in these areas, that UoA is uniquely placed within Australia to support Australia's resources boom.

At the University of South Australia (UniSA), following the closure of its

Bachelor of Engineering in Mining Engineering program in 2006, the School of Natural and Built Environments is developing a nested Graduate Certificate, Graduate Diploma and Master of Engineering in Sustainable Mining with support from the Department of Primary Industry and Resources SA. A key element of this minerals industry education initiative will be the establishment of on-site learning facilities at mining sites in South Australia and the teaching of block courses for example on the Whyalla campus of UniSA. Engineering and geoscience graduates who enrol in the Masters program will graduate with the skills and knowledge equivalent to a four-year Bachelor of Engineering in Mining Engineering. It is expected that the first intake into this new program will be in 2008.

The tertiary education institutes in South Australia have undergone some dramatic changes in the recent past and it looks like it was a 'just in time' delivery. The minerals industry at present and in the foreseeable future has a strong demand for new graduates with science, engineering

and also technical skills. The future of the geoscience education in South Australia will need to see a continuation and growth of the dedication and support from the industry which has strong partners in the SACOME (South Australian Chamber of Mines and Energy) and the local AusIMM Branch. The branch provides the link between the education institutions and the industry through technical meetings, the mentoring group and the organisation of annual events that provide an informal platform for the young undergraduates to meet their future employers. The youngest prospective earth scientist and engineers are also catered for during the annual ASMV excursions in which 2006 saw the strongest group of participants in the Southeast Australian section coming from South Australia.

It seems like South Australia is doing things right. More than 230 new students interested in first year geology and more than 200 applicants for the 60 places in the new mining engineering course in 2006 are the best indication that we are on track with the community's and industry's education demands. ■