



Geoscientist

WHAT DO GEOSCIENTISTS DO?

Geoscientists study the nature, composition and structure of the earth to increase scientific knowledge, locate materials and minerals, and advise on the extraction of minerals, environmental protection and rehabilitation of land after mining. Geoscientists may specialise as a Field/Exploration Geologist, Geochemist/Mineralogist/Petrologist, Geomorphologist, Hydrogeologist/Hydrologist, Mathematical Geologist, Mine Geologist, Palaeontologist, Petroleum, Stratigrapher or a Structural Geologist.

Geoscientists may perform the following tasks:

- explore specific areas of the earth to work out its structure and the types of rocks or minerals that exist
- study rock cores, cuttings and samples
- study geostatistics and sampling theory
- study fossilised life forms and date rock strata
- study the nature and effects of natural events such as erosion, sedimentation, glaciation, earthquakes and volcanic hazards
- locate and manage ground water resources, investigate ground water contamination and land salinity
- undertake geochemical sampling of stream sediment and soils
- undertake ground magnetic and gravity surveys
- examine geological specimens in laboratories using optical, X-ray and electron microscope, chemical and mechanical techniques
- assist in determining the economics of extracting earth resources
- advise on the geological suitability of sites for structures such as tunnels, roads, coastal installations, bridges and water supply schemes
- contribute to environmental assessments such as land use, planning and rehabilitation, pollution studies and the seabed
- use computers to integrate and interpret data sets of geological information
- prepare geological models to describe processes and predict future situations
- prepare geological reports and maps.

Geoscientists work in laboratories, offices and in the field. They may work independently or as members of a mixed team of professional and non-professional staff. They may have contact with the public, especially if needing permission to go onto private land. Fieldwork can involve spending time in remote desert, tropical or Antarctic/arctic regions. The hours of work can be irregular and it may be necessary to spend long periods away from home.

WHAT ARE THE CAREER OPPORTUNITIES?

Geology is a rapidly expanding discipline, and geology graduates are now finding jobs in a variety of different areas. In addition to the traditional areas of mining and exploration, geoscientists are now employed in areas such as water quality, water resources, hazard and pollution monitoring, coastal zone management, urban and rural planning, and rehabilitation of mine sites.

Exploration Geologist

Field/Exploration Geologists carry out surveys and fieldwork to determine the geological structure, distribution and age of rocks; and can indicate where particular natural resources are likely to be found.

Mine Geologist - Open Pit

Open Pit Mine Geologists control the grade (or quality) of the ore mined and locate extensions to ore deposits, by deciding which areas of an ore body should be mined at a particular time in the open pit and defining the ore limits at the mine based on economic considerations. Open Pit mine geologists work above ground mapping, collecting and analysing samples.

Mine Geologist - Underground

Underground Mine Geologists control the grade (or quality) of the ore mined and locate extensions to ore deposits, by deciding which areas of an ore body should be mined at a particular time in underground developments defining the ore limits at the mine based on economic considerations. Underground mine geologists spend a lot of time mapping and collecting samples underground.

Computing/Mathematical Geologist

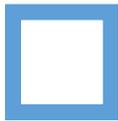
Computing/Mathematical Geologists predict the outcome of geological problems, by applying the most appropriate data and computer models to the geological information available.

Hydrogeologist

Hydrogeologists evaluate and manage the quality, quantity, reliability and sustainability of all aspects of water resources. Hydrogeologists are concerned with groundwater and the soil-moisture variation, amount, speed and direction of groundwater flow, extraction and replenishment of groundwater, water chemistry and pollution.

Geochemist/Mineralogist/Petrologist

Generally, geochemists are concerned with the distribution of elements in the earth with the aim of finding new mineral deposits (exploration application) or with the life cycles of elements. Geochemists study the mineral and chemical composition of rocks using equipment such as optical and electron microscopes, X-ray diffraction, atomic absorption and mass spectrometry. They may also be involved in examining the transport of pollutants through rock masses.



Academic/Research Geologist

Academic and Research geologists often work in universities or CRC's (cooperative research centres). Rather than looking primarily at the economic issues of how to mine most economically and locating the boundaries of ore deposits for this reason, academic and research geologists investigate why and how things behave the way they do or are the way they are.

Consulting Geologist

Consulting Geologists often work on many different projects and will probably be exposed to both underground and open pit mine geology. Consulting geologists are more likely to be based in urban centres and fly out to projects if necessary.

Geostatistician

Geostatisticians apply statistical methods to geological information to determine factors such as grade and mineral concentration in different volumes of rock mass. Geostatisticians tend to work in areas like resource estimation and reporting of resources and reserves. Geostatisticians are also involved with planning sampling programs.

Geophysicist

Geophysicists study physical aspects of the earth to determine its structure and composition, locate minerals, petroleum or ground water and to detect, monitor and forecast seismic, magnetic, electrical, thermal and oceanographic activity.

MARK NOPPÉ

BSc (Geol; Chem) BSc Hons (Geol) MSc (Exploration Geology) MAusIMM CPGeo Director, Regional Manager, Principal Consultant Geologist for Snowden Mining Industry Consultants Pty Limited

What have you enjoyed most about your profession(s)?

The challenge of problem solving and the satisfaction of scoping out and delivering a solution. These opportunities tend to be available in both operational and consulting roles, although the mix of routine and project-type work does differ. I also get satisfaction from sharing my experience in geology, geostatistics and resource estimation through training and mentoring assignments.

What are the negatives and low points in your career?

Very few. I can recall the frustration and uncertainty when I felt that I was not being sufficiently challenged or utilised, or could not see where my career was heading, but this is not unique to my profession.

For someone considering a career in your profession are there any words of wisdom to pass onto them?

It is important to gain solid practical experience before entering consulting because you will be engaged according to your ability, experience and track record. If you find yourself frustrated with where your career is going, try to find someone (a mentor?) in your organization who you can discuss your aspirations with. Keep your enthusiasm burning (it does show!) and pursue opportunities and appropriate new skills to get you where you want to be. Make your own luck!

DAVID BUSHELL

B.Sc (Hons) Geology; MAusIMM Senior Exploration Geologist, Iluka Resources Ltd.

What formal qualifications do you have?

I graduated from LaTrobe University in Bundoora (Vic) in mid 1996 with a Bachelor of Science (Honours) degree. I had previously (1987) completed an apprenticeship and have a qualification as an Instrument Technician from the Royal Melbourne Institute of Technology.

Do I have any regrets about how your career has developed?

I am happy with my career development so far. Iluka has allowed me to continue my training and personal development and I have gained a Diploma in Frontline Management. With the Murray Basin evolving from an exploration play to a mining district, my role is also evolving, and Iluka is also expanding its exploration base across the country which provides further opportunity.

What have you enjoyed most about your profession(s)?

I have worked in places that people pay to go for their holidays. I have seen some great sights and met some beautiful people. Technically, was luck enough to come into the Murray Basin while it was still in its infancy and have had many commercial and technical successes. I have made an effort to personally train as many new graduates as I could given the resources available and take pleasure in seeing them move off with their careers.

What are the negatives and low points in your career?

Living away from my wife put a strain on our relationship. That was hard work. Also, as with any job, administration often gets in the way of the part I love, being the geology.

DONNA FRATER - SENIOR GEOLOGIST

Projects Development Group BMA Coal

What formal qualifications do you have?

I have an Applied Science (Geology) degree with Honours from the University of NSW, and a MBA from the University of New England.

Why did you choose your particular career?

I wanted a challenging job that was more outdoors than inside, I also wanted to travel with work and my preference was to live in regional Australia.

Why did you choose your particular career?

I have worked both as a Mine Geologist (Iron Ore in WA, Coal in QLD and NSW) and in Exploration. I have worked in small coal exploration consultant groups and large mining companies in open cut coal mines in NSW and QLD and then been involved with a short term coal feasibility study in Zimbabwe and also all facets of exploration from Greenfield to short term exploration in coal in QLD.

What have you enjoyed most about your profession?

Being a geologist has allowed me to work in some fantastic places, to contribute to real success in my workplace and has provided a fantastic lifestyle of travel and meeting good people.

For someone considering a career in your profession are there any words of wisdom to pass on to them?

Make sure you understand the lifestyle choices you are making. The isolated communities we work in can be magnificent if they are places you want to be and not just for 2 or 3 years, a career in mining means regional living or transient living for 10 – 15 years or more.

NEIL SCHOFIELD

BSc Hons(Geol), MSc (Applied Earth Sciences) MAusIMM, MAIG Principal of Hellman and Schofield P.L. – Technical Consultants to the Minerals Industry

Why did you choose your particular career(s)?

One of my high school teachers suggested a career in geology even though it was not available at the school. For someone with a general interest in science, geology has a lot to offer because the various avenues of enquiry in geology touch many other areas of scientific interest from cosmology to biology and botany. And for the numerically challenged, geology gives the appearance of requiring fewer quantitative skills compared to the various avenues available in engineering. Later, computing and geostatistics presented an interesting challenge when I was looking for a change of career and a move away from the nomadic life of exploration. Advances in spatial numerical modelling and computing will help to provide the basis for the successful development of mining projects into the future.

What have you done?

My years in mineral exploration were spent throughout Papua New Guinea, Australia and Indonesia ranging over geologic terrains of all ages, in wet and dry climates, and involving exploration for a variety of metals in different mineralization styles. The experience of this variety provides an important basis for a career in the minerals industry. One is also exposed to a wide range of views regarding mineralization and its formation. The connection to the second part of my career came when working with a team of geologists in Sulawesi on a number of copper-gold porphyries. At the completion of an advanced exploration program, my limitations in resource evaluation became apparent. It has been possible to continue to expand my geological experience while working in the more specialized field of resource modelling and geostatistics. Like mine geology, resource modelling is more concerned with the detailed geometry and structure of mineral deposits compared to the broader picture that is the focus of exploration. The tools of geostatistics have broad application from resource modelling to ore control, ore sequencing and stockpiling. It is a field of ongoing research where new and important methods of problem solving are continuously evolving.

What have you enjoyed most about your profession(s)?

The opportunity for travel and experience both a variety of human cultures, climates and geological terrains are the highlights of a career in exploration. Real success in exploration is an elusive experience for

many geologists but the variety of life and friendships is the obvious benefit.

Resource modelling and the development of new approaches to the efficient exploitation of mineral resources present an interesting challenge and another view of both the mining industry and the application of scientific methods. It lacks some of the cultural richness of the exploration life but appears to have other compensations.

What are the negatives and low points in your career?

That big discovery that most explorationists hunger for, can be a long time coming. Taking responsibility for errors in your work in any career can be a little depressing.

For someone considering a career in your profession are there any words of wisdom to pass on to them?

If you are really interested in rocks and travelling around, exploration has a lot to offer. Broad experience in mineralization and mineral deposits is a useful background for a career in resource modelling and ore control.

KIRSTY CULVER

BSc (Applied Geology) (Honours)
Exploration Geologist – Jubilee Mines

Why did I choose my particular career(s)?

I chose geology because I was interested in science and geography at school and I didn't want to be stuck in an office all day everyday, I enjoy working outdoors.

What I have done?

I completed my degree and honours at Curtin University in 2001. I was employed by BHP Billiton in February 2002 as a graduate mine geologist working at Mt Whaleback, Newman. I worked as a mine geo for about a year in production before moving into the Reserve Definition Group (RDG). I spent a lot of time on a reverse circulation rig drilling orebodies around the Newman area - Orebodies 18 & 25, Jumblebar and updating geology and structural models. In May 2005 I got a job with Jubilee Mines as an exploration geologist at their Cosmos Nickel Project. Here I supervise drilling and everything else that goes along with it. There's lots of planning, updating and logging core, we have 6 diamond drill rigs at Cosmos drilling to the south of the mine so it keeps us all pretty busy.

Do I have any regrets about how my career has developed?

Regrets? There's no point thinking about what could've been, I'm happy with where I'm at and where I'm going and that's all that matters really.

What I have enjoyed most about your profession(s)?

I'd have to say just getting out, seeing the countryside, and also going out to the drill rig in the morning and there is a nice massive sulphide intersection in the core trays, that's exciting.

For someone considering a career in your profession are there any words of wisdom to pass on to them?

Do as much hands on / varied work as you can when you start out, that way you'll get an idea of how you want your career to progress.

knowledge. Ask questions all the time.

DONNA FRATER

Senior Geologist
Projects Development Group
BHP Billiton Mitsubishi Alliance

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