



Careers in Materials Science and Engineering

Never Stand Still

Science

School of Materials Science and Engineering



Materials Science and Engineering at UNSW

Materials Science and Engineering is a very special and unique area of study. It combines both the fundamental and applied sciences; the courses you will study in our degrees include elements of physics, chemistry, mathematics, engineering and management. Our students learn to understand the relationship between the processing of materials, their structure and properties, and how to apply them as engineering materials.

Graduates from the school readily find employment with a range of companies from mining giants, such as BHP Billiton and Rio Tinto, to multinational companies designing and developing next generation semiconductor devices. The broad education experienced by our graduates makes them highly sought after by many leading companies.

In a recent international survey the School was ranked as the top Materials Science and Engineering School in Australia and one of the top departments overall in the world. The lecturers in the school are some of the leading academics in their field and bring their expertise daily into the classroom. Our students enjoy an intense and rich learning experience.

In 2015 the School will move to a new state-of-the-art building. This will not only include suites of cutting edge research tools, but some spectacular purpose built spaces for undergraduate learning.



In summary, Materials Science and Engineering is an exciting and expanding discipline with prospects for rewarding and exciting careers in a broad range of industries.

Please look through this brochure and see what we can offer.

Professor Paul Munroe
Head of School, Materials Science and Engineering
UNSW Science

Reasons to study Materials Science at UNSW

Our reputation and experience

Our School is an internationally renowned educator and researcher with over 60 years of experience. Our School is looking to the future with award winning staff, leading programs of study and research.

Our size

At UNSW you will be part of a vibrant, dynamic and multicultural community of around 50,000 students and simultaneously you will enjoy the benefits of being part a friendly and intimate school.

Our extensive network

Our industry links give our students the opportunity to develop valuable relationships with Australia's materials engineering enterprises.

Excellent career prospects

The breadth and quality of skills developed by our students mean our graduates are sought by a wide range of employers in science and engineering sectors, as well as business and finance.

Our state-of-the-art facilities and equipment

The School is well equipped with a wide range of advanced computing, thermal analysis, mechanical testing and optical and electron microscopy facilities.

Lecturers leaders in their field

Our teachers are internationally renowned and have won numerous education awards in recent years.



Careers in Materials Science and Engineering

Everything we use is made of materials, yet only a handful of these materials actually occur naturally. All the rest have been microscopically engineered – originally by nature, but increasingly by materials engineers.

As a Materials Science and Engineering graduate you will be able to work in materials process engineering, research and development, quality control, technical support, management, technical sales, marketing and consulting.

Employers range from primary material producers and refiners to the transport industry, the defence forces, universities, research institutions and multinational technical-consultancy firms.

UAC code	429600
UNSW code	3135
Course duration	4 years FT
2013 cut off	ATAR 84.00 IB 31

Opportunities for scientific and commercial endeavors for Materials Science graduates include:

Sustainable processing

Help to reduce our ever growing pollution problems by developing and modifying new materials which may replace non-biodegradable materials currently in use.

Sustainable materials processing, particularly of our mineral resources, is vital to the long term future of Australian and international industry.

Energy & electronics

Green energy is an increasing fundamental concern in our society of limited resources. Materials Science at UNSW is at the forefront of developing environmentally friendly and safe solar hydrogen generation systems.

Electronics are becoming smaller as micro turns into nano turns into quantum electronics. Engineering chips, atom by atom, is intense materials engineering. Materials Engineering is playing a vital role in diverse developments across the fields of energy generation and electronics.

Manufacture

Materials Engineers are the link between other engineering disciplines and the raw materials required for advanced use, by processing and creating the steel, aluminium, carbon fibre, plastics, rubbers and much more needed in all industry.

The vital knowledge of Materials Engineers regarding processes and properties of materials makes them invaluable in many manufacturing solutions; whether it be bricks, aluminium cans, sonar systems, hearing aids, prostheses or synthetic diamonds.

Failure analysis

Why did the RMS Titanic sink? Why did the Hindenburg explode? Why has this material failed? Failure Analysts are involved in analysing catastrophes and failures using advanced techniques. Materials failures occur in manufacturing, transport, energy, biomedicine, construction - essentially in any area where materials are used.



Dual Materials Science and Engineering Degrees

Our School is also able to offer you dual degrees that enable you to combine a Materials Science and Engineering degree with a degree from another faculty, offering you the flexibility to explore other interests.

Career prospects for dual degree graduates

Assumed knowledge:

HSC Mathematics Extension 1
Physics

Recommended knowledge:

HSC Mathematics Extension 2
Chemistry
Engineering Studies

Materials Science and Engineering/Commerce

A diverse range of careers are available to those who successfully complete this dual degree. Many engineers often progress to technical management roles. With this degree you are ahead of the rest with not only the engineering skills but also the business acumen.

UAC code	429610
UNSW code	3136
Course duration	5.5 years FT
2013 cut off	ATAR 96.30 IB 38

Materials Science and Engineering/Master of Biomedical Engineering

This five-year concurrent degree consisting of a four year Bachelor of Engineering in Materials Science and Engineering and a final year Master of Biomedical Engineering is specifically designed to cater for students wishing to pursue a career in biomedical engineering through the technical base of materials science and engineering.

An increasing number of materials engineers in Australia and overseas are involved in the development, processing and application of materials used in many areas of biomedical engineering including: orthopaedics, dental and maxillofacial implants, artificial vascular materials, controlled drug delivery, prosthetics and orthotics and device housings.

UAC code	429630
UNSW code	3138
Course duration	5 years FT
2013 cut off	ATAR 91.00 IB 34

Materials Science and Engineering/ Chemical Engineering

The five-year dual-degree consisting of a Bachelor of Engineering in Materials Science and Engineering and a Bachelor of Engineering in Chemical Engineering is designed specifically to cater for students wishing to pursue a career in materials/chemical engineering with professional accreditation in both disciplines.

Graduates will be well qualified to work in the chemical and petrochemical processing industries and in jobs in the broad areas of materials extraction, polymers or ceramic processing.

UAC code	429620
UNSW code	3137
Course duration	5 years FT
2013 cut off	ATAR 91.00 IB 34

Professional Recognition:

The Materials Science and Engineering programs are accredited with the Institute of Engineers Australia.



Graduate Profiles

“I chose Materials Science and Engineering at UNSW because it combines the analytical side of science with the problem solving aspects of Engineering”



Steven Pert
Bachelor of Materials Science and Engineering
Class of 2011

Why did you choose to study Materials Science and Engineering?

After going to the UNSW careers fair and talking to some of the lecturers and students I was really impressed by their knowledge and passion. Plus I noticed really quickly that with materials science you have the flexibility to choose the cutting edge side of science in developing new materials, or the practical side in the processing and applications of engineering materials such as bricks, steel and aluminium. I was also attracted to the large number of scholarships that the School offers.

What does your current role involve?

I am working as a Reduction Engineer* in the Aluminium division of Rio Tinto (now called Pacific Aluminium). This involves the manufacture of primary aluminium from alumina via the Hall-Heroult process. This process is very energy intensive and requires technical expertise to run a plant efficiently. Hence there are many opportunities in the company to be involved in a wide range of projects, from process improvements to new reduction cell design. My role also involves significant travel to sites in Queensland, Newcastle, Tasmania and New Zealand.

*The process of converting refined alumina into primary aluminium.

Do you have any advice for high school students considering studying Materials Science at UNSW?

My advice for high school students is to think carefully about what you are interested in. If you find yourself interested in the science side of things but want a practical degree then this degree is perfect. I would also recommend doing some research into what companies you can potentially work for when you graduate.

Majors

Metallurgy, which underlies our most widely used engineering materials, including aluminium, steel and copper.

Ceramics, including bioceramics, solid-state electronics, nuclear materials and super-conductors. It can also include bricks, tiles, glass, pottery and refractories.

Plastics and composites are engineered polymers and tailored combinations of materials that are revolutionising the world of materials and replacing traditional materials.



Graduate Profiles continued

“UNSW was an easy choice because of its world-class reputation in Materials Science and Engineering and the opportunity to learn from academics and researchers who are top of their fields”



Cathy Liu

Bachelor of Materials Science and Engineering/ Master of Biomedical Engineering
Class of 2012

Why did you choose to study Materials Science and Engineering?

I always loved science in high school, both the theoretical studies and the practical activities. As such, studying science and engineering at university was an easy decision when the time came to pick my degree.

I specifically chose to study a dual degree in Materials Science and Biomedical Engineering because I was (and still am) particularly interested in understanding the different nature of the myriad of materials we take for granted everyday, and applying to different biomedical areas.

What does your current role involve?

In my current role as an Analyst at the Reserve Bank of Australia, I receive data and research information on currency and banknote production and distribution from different areas of expertise every day.

My work, in short, involves analysing the data and collating the research information together. Most of the time, the assembled information will be passed onto senior management for review.

I am also working on multiple projects concurrently, so I am definitely getting involved in some project management. Specifically, I am learning how to re-assess and re-prioritise my tasks on a weekly (sometimes daily) basis, as well as learning how to people manage and time manage effectively.

Do you have any advice for high school students considering studying Materials Science at UNSW?

The School of Materials Science and Engineering at UNSW has done an amazing job in preparing me for my current job.

The knowledge I gained in classes helps me to better understand the background of my work. More significantly, the skills I have developed have been invaluable. The critical reasoning skills I gained through both research and classes have given me a solid framework for systematically analysing and solving problems in my role as an analyst. As such, I would highly recommend Materials Science at UNSW to any school leavers who are considering a well-rounded education in science and engineering.

tinyurl.com/lr9dohp

Other MSE roles include

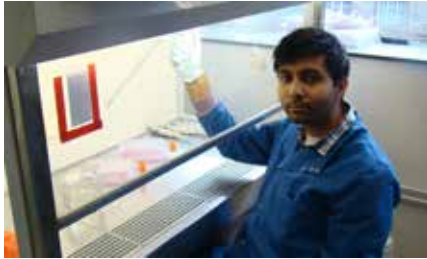
Metallurgists
Extractive Metallurgists
Ceramist
Polymer Scientists
Forensic Scientists
Quality Control
Composite Technologists
Technical Sales and Marketing

Industries

Aviation
Marine
Mining
Semiconductors
Automotive
Construction

Research in Materials Science and Engineering

As a Materials Science and Engineering graduate you may pursue a career in research by undertaking a masters by research (PhD).



Paresh Parmar

Bachelor of Materials Science and Engineering/ Master of Biomedical Engineering
Class of 2012

Why did you choose to study Materials Science and Engineering?

Materials Science is all around us in everyday living. It takes many different forms that are all interconnected. It aims to aid people by improving their quality of life in one way or another. As a result, I developed a fascination in a field such as this that can more or less answer any type of question from an early age.

During high school, I also chose subjects oriented towards Materials Science since I knew I wanted to enter this discipline down the track.

Studying a Materials Science and Engineering degree has provided me with an extensive and appropriate background to solve different types of problems that people encounter on a daily basis. It has enabled me to enhance my general cognitive and technical ability to better understand various scenarios at work.

What does your current role involve?

At the moment, I am studying a PhD at Imperial College London in tissue engineering. I am working as part of a large group, known as The Stevens Group, which is focused on regenerating natural body organs using different materials, techniques and technology.

Personally, I am looking at replacing and subsequently producing natural cartilage from scratch for people who have or are suffering from different health-related diseases and injuries, such as osteoarthritis, osteochondral defects and sports-related injuries.

In this project, there is a lot of collaboration within the group as well as from outside the group, including the Commonwealth Scientific and Industrial Research Organisation (CSIRO, Melbourne) and others, to achieve our target goal together.

Do you have any advice for high school students considering studying Materials Science at UNSW?

To young people thinking of pursuing a career in Materials Science at UNSW, I would say just follow your interests. You may be surprised by how far it can take you in this field. You have the perfect opportunity to study a degree that has countless exciting, challenging and equally rewarding options. Science and Engineering are all around us. You should explore and enjoy it!

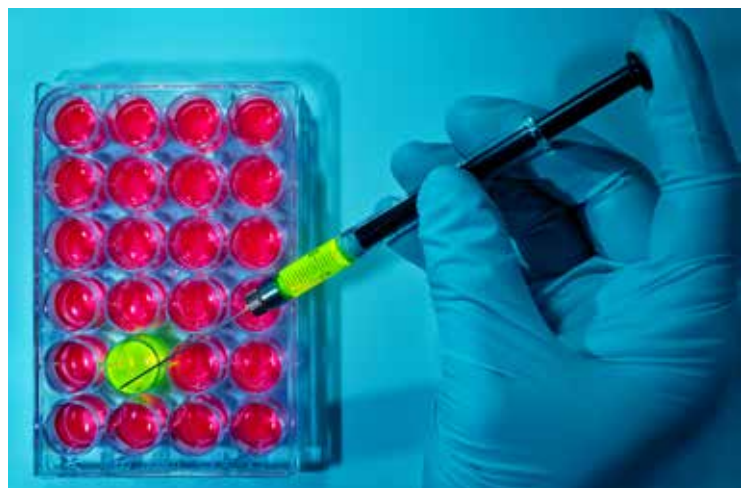
Useful links

School of Materials Science and Engineering
materials.unsw.edu.au

UNSW Science
science.unsw.edu.au

Scholarships
scholarships.unsw.edu.au

UNSW Careers and Employment
careers.unsw.edu.au



Scholarship Opportunities

A variety of scholarships are available to assist students commencing their studies in Materials Science and Engineering. Scholarships provide not only financial support for students' studies but usually also important opportunities to obtain experience and contacts in the profession through our many industry partners.

The School offers four types of Scholarships:

Co-op Scholarships Valued at \$16500 pa for up to 5 years (these are provided by industry sponsors and include a total of 16 months industrial experience during the course).

Industry Partnership Awards valued at \$3000 pa for up to 4 years (these are provided by industry sponsors, and include the opportunity for professional experience).

Privately endowed scholarships valued at \$2000 - \$2500 pa for up to 4 years

School Awards valued at \$1500 - \$2000 pa for up to 4 years.

Applications for these scholarships are usually due in September.
scholarships.unsw.edu.au

School of Material Science and Engineering UNSW Science

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