

Some Information about

Australia – ANU – NICTA

Australia

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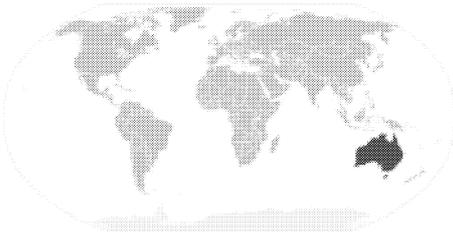
The **Commonwealth of Australia** is a country in the southern hemisphere comprising the mainland of the world's smallest continent, the major island of Tasmania, and a number of other islands in the Indian and Pacific Oceans.^{N4} The neighbouring countries are Indonesia, East Timor, and Papua New Guinea to the north, the Solomon Islands, Vanuatu, and New Caledonia to the north-east, and New Zealand to the south-east.

The Australian mainland has been inhabited for more than 42,000 years by Indigenous Australians.^[2] After sporadic visits by fishermen from the north and then European discovery by Dutch explorers in 1606,^[3] the eastern half of Australia was later claimed by the British in 1770 and initially settled through penal transportation as part of the colony of New South Wales, commencing on 26 January 1788. As the population grew and new areas were explored, another five largely self-governing Crown Colonies were established during the 19th century.

On 1 January 1901, the six colonies became a federation, and the Commonwealth of Australia was formed. Since federation, Australia has maintained a stable liberal democratic political system and remains a Commonwealth realm. The capital city is Canberra, located in the Australian Capital Territory (ACT). The population is just over 21 million, with approximately 60% of the population concentrated in and around the mainland state capitals of Sydney, Melbourne, Brisbane, Perth, and Adelaide.

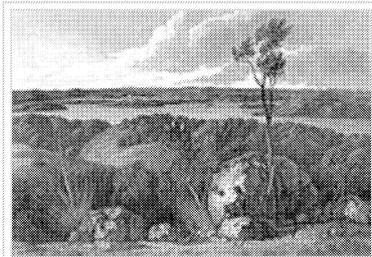
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Commonwealth of Australia	
	
Flag	Coat of arms
Anthem: <i>Advance Australia Fair</i> ^{N1}	
	
Capital	Canberra  35°18'S, 149°08'E
Largest city	Sydney
Official languages	English (<i>de facto</i> ^{N2})
Demonym	Australian
Government	Parliamentary democracy and constitutional monarchy
-Monarch	Queen Elizabeth II
-Governor-General	Michael Jeffery
-Prime Minister	Kevin Rudd
Independence	from the United Kingdom
-Constitution	1 January 1901
-Statute of Westminster	11 December 1931 (adopted 9 September 1939)
-Australia Act	3 March 1986
Area	
-Total	7,741,220 km ² (6th) 2,988,888 sq mi
-Water (%)	1
Population	
-2008 estimate	21,200,000 ^[1] (53rd)
-2006 census	19,855,288

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Etymology



Artists rendition of Port Jackson, the site where Sydney was established, viewed from the South Head. (From *A Voyage to Terra Australis*.)

The name "Australia" is derived from the Latin *Australis*, meaning "Southern". Legends of an "unknown land of the south" (*terra australis incognita*) date back to

Roman times and were commonplace in medieval geography, but were not based on any actual knowledge of the continent. The first use of the word "Australia" in English was in 1625—the words "A note of Australia del Espiritu Santo, written by Master Hakluyt", published by Samuel Purchas in *Hakluytus Posthumus*.^[4] The Dutch adjectival form *Australische* was used by Dutch officials in Batavia to refer to the newly discovered land to the south in 1638. "Australia" was used in a 1693 translation of *Les Aventures de Jacques Sadeur dans la Découverte et le Voyage de la Terre Australe*, a 1692 French novel by Gabriel de Foigny under the pen name Jacques Sadeur.^[5] Alexander Dalrymple then used it in *An Historical Collection of Voyages and Discoveries in the South Pacific Ocean* (1771), to refer to the entire South Pacific region. In 1793, George Shaw and Sir James Smith published *Zoology and Botany of New Holland*, in which they wrote of "the vast island, or rather continent, of Australia, Australasia or New Holland."

The name "Australia" was popularised by the 1814 work *A Voyage to Terra Australis* by the navigator Matthew Flinders, the first recorded person to circumnavigate Australia. Though its title reflected the British Admiralty's usage, Flinders used the word "Australia" in his book, and as it was widely read it gave the term general currency. Governor Lachlan Macquarie of New South Wales subsequently used the word in his dispatches to England, and on 12 December 1817 recommended to the Colonial Office that it be officially adopted.^[6] In 1824, the Admiralty agreed that the continent should be known officially as "Australia".

The word "Australia" in Australian English is pronounced /əˈstræɪljə, -liːə, -jə/.

History

The first human habitation of Australia is estimated to have occurred between 42,000 and 48,000 years ago.^[7] These first Australians were possibly the ancestors of the current Indigenous Australians; they may have arrived via land bridges and short sea-crossings from present-day South-

-Density	2.6/km ² (224th) 6.7/sq mi
GDP (PPP)	2007 estimate
-Total	US\$718.4 billion (IMF) (17th)
-Per capita	US\$34,359 (IMF) (14th)
GDP (nominal)	2007 estimate
-Total	US\$889.7 billion (AU \$1.1 trillion) (15th)
-Per capita	US\$42,553 (DFAT) (16th)
HDI (2007)	 — 0.962 (high) (3rd)
Currency	Australian dollar (AUD)
Time zone	various ^{N3} (UTC+8 to +10.5)
-Summer (DST)	various ^{N3} (UTC+9 to +11.5)
Internet TLD	.au
Calling code	+61

East Asia. Most of these people were hunter-gatherers, with a complex oral culture and spiritual values based on reverence for the land and a belief in the Dreamtime. The Torres Strait Islanders, ethnically Melanesian, inhabited the Torres Strait Islands and parts of far-north Queensland; their cultural practices were and remain distinct from those of the Aborigines.



Lieutenant James Cook charted the east coast of Australia on HM Bark *Endeavour*, claiming the land for Great Britain in 1770. This replica was built in Fremantle in 1988; photographed in Cooktown Harbour where Cook spent seven weeks.

The first recorded European sighting of the Australian mainland was made by the Dutch navigator Willem Janszoon, who sighted the coast of Cape York Peninsula in 1606. During the 17th century, the Dutch charted the whole of the western and northern coastlines of what they called New Holland, but made no attempt at settlement. In 1770, James Cook sailed along and mapped the east coast of Australia, which he named New South Wales and claimed for Great Britain. The expedition's discoveries provided impetus for the establishment of a penal colony there.

The British Crown Colony of New South Wales started with the establishment of a settlement at Port Jackson by Captain Arthur Phillip on 26 January 1788. This date was later to become Australia's national day, Australia Day. Van Diemen's Land, now known as Tasmania, was settled in 1803 and became a separate colony in 1825. The United Kingdom formally claimed the western part of Australia in 1829. Separate colonies were created from parts of New

South Wales: South Australia in 1836, Victoria in 1851, and Queensland in 1859. The Northern Territory (NT) was founded in 1911 when it was excised from South Australia. South Australia was founded as a "free province"—that is, it was never a penal colony. Victoria and Western Australia were also founded "free", but later accepted transported convicts.^{[8][9]} The transportation of convicts to the colony of New South Wales ceased in 1848 after a campaign by the settlers.^[10]

The Indigenous Australian population, estimated at 350,000 at the time of European settlement,^[11] declined steeply for 150 years following settlement, mainly because of infectious disease combined with forced re-settlement and cultural disintegration.^[12] The removal of children from their families, which some historians and Indigenous Australians have argued could be considered to constitute genocide by some definitions,^[13] may have contributed to the decline in the indigenous population. Such interpretations of Aboriginal history are disputed by some commentators as being exaggerated or fabricated for political or ideological reasons.^[14]

This debate is known within Australia as the History Wars. Following the 1967 referendum, the Federal government gained the power to implement policies and make laws with respect to Aborigines. Traditional ownership of land—native title—was not recognised until 1992, when the High Court case *Mabo v Queensland (No 2)* overturned the notion of Australia as *terra nullius* ("empty land") at the time of European occupation.



Port Arthur, Tasmania was Australia's largest gaol for transported convicts.

A gold rush began in Australia in the early 1850s, and the Eureka Stockade rebellion against mining licence fees in 1854 was an early expression of civil disobedience. Between 1855 and 1890, the six colonies individually gained responsible government, managing most of their own affairs while remaining part of the British Empire. The Colonial Office in London retained control of some matters, notably foreign affairs, defence, and international shipping. On 1 January 1901, federation of the colonies was achieved after a decade of planning, consultation, and voting, and the Commonwealth of Australia was born as a Dominion of the British Empire. The Federal Capital Territory (later renamed the Australian Capital



The Last Post is played at an ANZAC Day ceremony in Port Melbourne, Victoria, 25 April 2005. Such ceremonies are held in virtually every suburb and town in Australia.

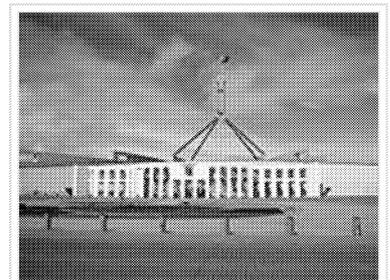
Territory) was formed from a part of New South Wales in 1911 to provide a location for the proposed new federal capital of Canberra (Melbourne was the temporary seat of government from 1901 to 1927 while Canberra was being constructed). The Northern Territory was transferred from the control of the South Australian government to the Commonwealth in 1911. Australia willingly participated in World War I.^[15] Many Australians regard the defeat of the Australian and New Zealand Army Corps (ANZACs) at Gallipoli as the birth of the nation—its first major military action. The Kokoda Track Campaign is regarded by many as an analogous nation-defining event during World War II.

The Statute of Westminster 1931 formally ended most of the constitutional links between Australia and the United Kingdom when Australia adopted it in 1942. The shock of the United Kingdom's defeat in Asia in 1942 and the threat of Japanese invasion

caused Australia to turn to the United States as a new ally and protector. Since 1951, Australia has been a formal military ally of the US under the auspices of the ANZUS treaty. After World War II, Australia encouraged immigration from Europe; since the 1970s and the abolition of the White Australia policy, immigration from Asia and other non-European parts of the world was also encouraged. As a result, Australia's demography, culture, and self-image have been radically transformed. The final constitutional ties between Australia and the UK were severed in 1986 with the passing of the Australia Act 1986, ending any British role in the government of the Australian States, and ending judicial appeals to the UK Privy Council.^[16] In 1999, Australian voters rejected by a majority of less than 5% a move to become a republic with a president appointed by Parliament.^[17] Since the election of the Whitlam Government in 1972, there has been an increasing focus on the expansion of ties with other Pacific Rim nations.

Politics

The Commonwealth of Australia is a constitutional democracy based on a federal division of powers. The form of government used in Australia is a constitutional monarchy with a parliamentary system of government. Queen Elizabeth II is the Queen of Australia, a role that is distinct from her position as monarch of the other Commonwealth realms. The Queen is represented by the Governor-General at federal level and by the Governors at state level. Although the Constitution gives extensive executive powers to the Governor-General, these are normally exercised only on the advice of the Prime Minister. The most notable exercise of the Governor-General's reserve powers outside the Prime Minister's direction was the dismissal of the Whitlam Government in the constitutional crisis of 1975.^[18]



Parliament House in Canberra was opened in 1988 replacing the provisional Parliament House building opened in 1927.

There are three branches of government:

- The legislature: the Commonwealth Parliament, comprising the Queen, the Senate, and the House of Representatives; the Queen is represented by the Governor-General, who by convention acts on the advice of his Ministers.
- The executive: the Federal Executive Council (the Governor-General as advised by the Executive Councillors); in practice, the councillors are the Prime Minister and Ministers of State.

- The judiciary: the High Court of Australia and other federal courts. Appeals from Australian courts to the Judicial Committee of the Privy Council in the United Kingdom ceased when the *Australia Act* was passed in 1986.

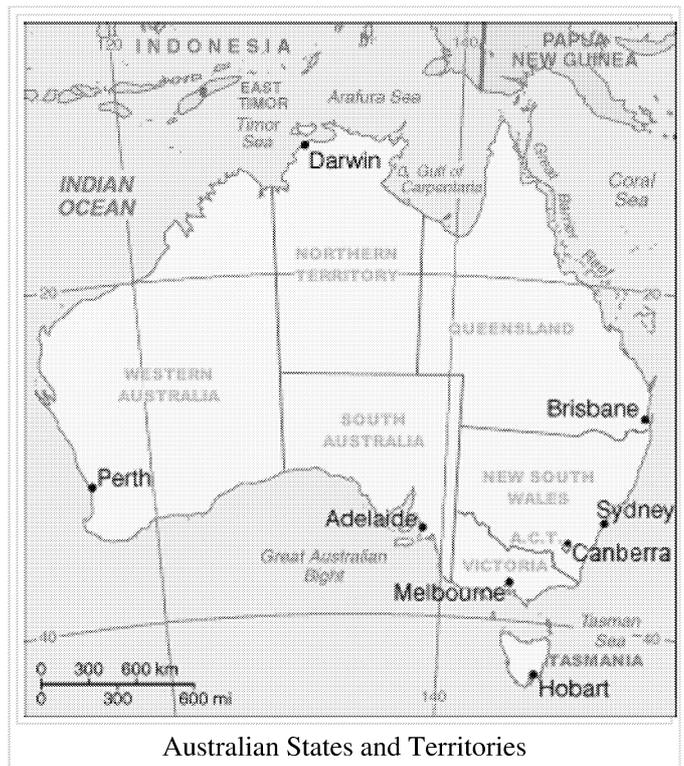
The bicameral Commonwealth Parliament consists of the Queen, the Senate (the upper house) of 76 senators, and a House of Representatives (the lower house) of 150 members. Members of the lower house are elected from single-member constituencies, commonly known as "electorates" or "seats". Seats in the House of Representatives are allocated to states on the basis of population, with each original state guaranteed a minimum of five seats. In the Senate, each state is represented by 12 senators, and each of the territories (the ACT and the NT) by two. Elections for both chambers are held every three years; senators have overlapping six-year terms, and only half of the seats are put to each election unless the cycle is interrupted by a double dissolution. The party with majority support in the House of Representatives forms government, and its leader becomes Prime Minister.

There are two major political groups that form government: the Australian Labor Party, and the Coalition which is a grouping of two parties: the Liberal Party, and its minor partner, the National Party. Independent members and several minor parties—including the Greens and the Australian Democrats—have achieved representation in Australian parliaments, mostly in upper houses. Since 3 December 2007, shortly after the 2007 election, the Labor Party led by the Prime Minister Kevin Rudd has been in power in Canberra, and the party is now in power in every parliament in the country. In the 2004 election, the previous governing Coalition led by John Howard won control of the Senate—the first time in more than 20 years that a party (or a coalition) has done so while in government. Voting is compulsory for all enrolled citizens 18 years and over, in each state and territory and at the federal level. Enrolment to vote is compulsory in all jurisdictions except South Australia.^[19]

States and territories

Australia has six states, two major mainland territories, and other minor territories. The states are New South Wales, Queensland, South Australia, Tasmania, Victoria, and Western Australia. The two major mainland territories are the Northern Territory and the Australian Capital Territory. In most respects, the territories function like the states, but the Commonwealth Parliament can override any legislation of their parliaments. By contrast, federal legislation only overrides state legislation in certain areas that are set out in Section 51 of the Constitution; state parliaments retain all residual legislative powers, including powers over hospitals, education, police, the judiciary, roads, public transport, and local government.

Each state and territory has its own legislature: unicameral in the Northern Territory, the ACT, and Queensland, and bicameral in the remaining states. The lower house is known as the Legislative Assembly (House of Assembly in South Australia and Tasmania) and the upper house is known as the Legislative Council. The head of the government in each state is



Australian States and Territories

the premier, and in each territory the chief minister. The Queen is represented in each state by a governor; an administrator in the Northern Territory, and the Australian Governor-General in the ACT, have analogous roles.

Australia also has several minor territories; the federal government administers a separate area within New South Wales, the Jervis Bay Territory, as a naval base and sea port for the national capital. In addition Australia has the following, inhabited, external territories: Norfolk Island, Christmas Island, Cocos (Keeling) Islands, and several largely uninhabited external territories: Ashmore and Cartier Islands, Coral Sea Islands, Heard Island and McDonald Islands, and the Australian Antarctic Territory.

Foreign relations and the military

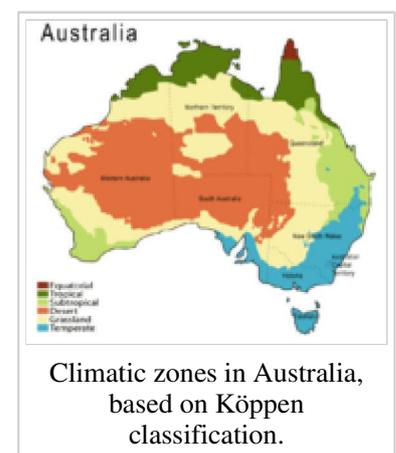
Over recent decades, Australia's foreign relations have been driven by a close association with the United States through the ANZUS pact, and by a desire to develop relationships with Asia and the Pacific, particularly through ASEAN and the Pacific Islands Forum. In 2005 Australia secured an inaugural seat at the East Asia Summit following its accession to the Treaty of Amity and Cooperation. Australia is a member of the Commonwealth of Nations, in which the Commonwealth Heads of Government meetings provide the main forum for co-operation. Australia has energetically pursued the cause of international trade liberalisation. Australia led the formation of the Cairns Group and APEC, and is a member of the OECD and the WTO. Australia has pursued several major bilateral free trade agreements, most recently the Australia-United States Free Trade Agreement and Closer Economic Relations with New Zealand. Australia is a founding member of the United Nations, and maintains an international aid program under which some 60 countries receive assistance. The 2005–06 budget provides A\$2.5 bn for development assistance;^[20] as a percentage of GDP, this contribution is less than that of the UN Millennium Development Goals.

Australia's armed forces—the Australian Defence Force (ADF)—comprise the Royal Australian Navy (RAN), the Australian Army, and the Royal Australian Air Force (RAAF), numbering about 51,000.^[21] All branches of the ADF have been involved in UN and regional peacekeeping (most recently in East Timor, the Solomon Islands and Sudan), disaster relief, and armed conflict, including the 2003 invasion of Iraq. The government appoints the Chief of the Defence Force from one of the armed services; the current Chief of the Defence Force is Air Chief Marshal Angus Houston. In the 2006–07 budget, defence spending is A\$22 bn.^[22]

Geography and environment

Australia's 7,617,930 square kilometres (2,941,299 sq. mi) landmass^[23] is on the Indo-Australian Plate. Surrounded by the Indian^{N4} and Pacific oceans, Australia is separated from Asia by the Arafura and Timor seas. Australia has 34,218 kilometres (21,262 mi) of coastline (excluding all offshore islands)^[24] and claims an extensive exclusive economic zone of 8,148,250 square kilometres (3,146,057 sq. mi). This exclusive economic zone does not include the Australian Antarctic Territory.

The Great Barrier Reef, the world's largest coral reef,^[25] lies a short distance off the north-east coast and extends for over 2,000 kilometres (1,250 mi). Mount Augustus, claimed to be the world's largest monolith,^[26] is located in Western Australia. At 2,228 metres (7,310 ft), Mount Kosciuszko on the Great Dividing



Range is the highest mountain on the Australian mainland, although Mawson Peak on the remote Australian territory of Heard Island is taller at 2,745 metres (9,006 ft).

By far the largest part of Australia is desert or semi-arid. Australia is the flattest continent, with the oldest and least fertile soils, and is the driest inhabited continent. Only the south-east and south-west corners of the continent have a temperate climate. Most of the population lives along the temperate south-eastern coastline. The landscapes of the northern part of the country, with a tropical climate, consist of rainforest, woodland, grassland, mangrove swamps, and desert. The climate is significantly influenced by ocean currents, including the El Niño southern oscillation, which is correlated with periodic drought, and the seasonal tropical low pressure system that produces cyclones in northern Australia.^{[27][28]}

Although most of Australia is semi-arid or desert, it includes a diverse range of habitats, from alpine heaths to tropical rainforests, and is recognised as a megadiverse country. Because of the continent's great age (and consequent low levels of fertility), its extremely variable weather patterns, and its long-term geographic isolation, much of Australia's biota is unique and diverse. About 85% of flowering plants, 84% of mammals, more than 45% of birds, and 89% of in-shore, temperate-zone fish are endemic.^[29] Many of Australia's ecoregions, and the species within those regions, are threatened by human activities and introduced plant and animal species. The federal *Environment Protection and Biodiversity Conservation Act 1999* is a legal framework for the protection of threatened species. Numerous protected areas have been created under the national Biodiversity Action Plan to protect and preserve unique ecosystems; 64 wetlands are registered under the Ramsar Convention, and 16 World Heritage Sites have been established. Australia was ranked 13th in the world on the 2005 Environmental Sustainability Index.^[30]



The koala and the *eucalyptus* forming an iconic Australian pair.

Most Australian woody plant species are evergreen and many are adapted to fire and drought, including many eucalypts and acacias. Australia has a rich variety of endemic legume species that thrive in nutrient-poor soils because of their symbiosis with Rhizobia bacteria and mycorrhizal fungi. Among well-known Australian fauna are the monotremes (the platypus and the echidna); a host of marsupials, including the kangaroo, the koala, and the wombat; the saltwater and freshwater crocodiles; and birds such as the emu and the kookaburra. Australia is home to the largest number of venomous snakes in the world.^[31] The dingo was introduced by Austronesian people who traded with Indigenous Australians around 3000 BCE.^[32] Many plant and animal species became extinct soon after first human settlement, including the Australian megafauna; others have become extinct since European settlement, among them the Thylacine.^{[33][34]}

Economy

Australia has a prosperous, Western-style mixed economy, with a per capita GDP slightly higher than those of the UK, Germany, and France in terms of purchasing power parity. The country was ranked third in the United Nations' 2007 Human Development Index and sixth in *The Economist* worldwide quality-of-life index 2005. The absence of an export-oriented manufacturing industry has been considered a key weakness of the Australian economy. More recently, rising prices for Australia's commodity exports and increasing tourism have made this criticism less relevant.



The Super Pit in Kalgoorlie,

Nevertheless, Australia has the world's fourth largest current account deficit in absolute terms (in relative terms it is more than 7% of GDP). This is considered problematic by some economists, especially as it has coincided with the high terms of trade and low interest rates that make the cost of servicing the foreign debt low.^[35]

Australia's largest open cut gold mine

The Hawke Government started the process of economic reform by floating the Australian dollar in 1983, and partially deregulating the financial system.^[36] The Howard government continued the process of microeconomic reform, including a partial deregulation of the labour market and the privatisation of state-owned businesses, most notably in the telecommunications industry.^[37] The indirect tax system was substantially reformed in July 2000 with the introduction of a 10% Goods and Services Tax (GST), which has slightly reduced the heavy reliance on personal and company income tax that characterises Australia's tax system.

At January 2007, there were 10,033,480 people employed, with an unemployment rate of 4.6%.^[38] Over the past decade, inflation has typically been 2–3% and the base interest rate 5–6%. The service sector of the economy, including tourism, education, and financial services, constitutes 69% of GDP.^[39] Agriculture and natural resources constitute 3% and 5% of GDP but contribute substantially to export performance. Australia's largest export markets include Japan, China, the US, South Korea, and New Zealand.^[40]

Demography



Most Australians live in urban areas. Sydney is the most populous city in the country.

Most of the estimated 21 million Australians are descended from colonial-era settlers and post-Federation immigrants from Europe, with around 90% of Australia's population being of European descent. For generations, the vast majority of both colonial-era settlers and post-Federation immigrants came almost

exclusively from the British Isles, and people of Anglo-Celtic ethnic origin still predominate.

Australia's population has quadrupled since the end of World War I,^[41] spurred by an ambitious immigration program. Following World War II and through to 2000, almost 5.9 million of the total population settled in the country as new immigrants, meaning that nearly two out of every seven Australians were born overseas.^[42] Most immigrants are skilled, but the immigration quota includes categories for family members and refugees. In 2001, the five largest groups of the 23.1% of Australians who were born overseas were from the United Kingdom, New Zealand, Italy, Vietnam, and China.^{[40][43]} Following the abolition of the White Australia policy in 1973, numerous government initiatives have been established to encourage and promote racial harmony based on a policy of multiculturalism.^[44] In 2005–06, more than 131,000 people emigrated to Australia, mainly from Asia and Oceania.^[45] Migration target for 2006–07 was 144,000.^{[46][47]}

Historical populations		
Census	Pop.	%±
1900	3,765,400	—
1910	4,525,100	20.2%
1920	5,411,000	19.6%
1930	6,501,000	20.1%
1940	7,078,000	8.9%
1950	8,307,000	17.4%
1960	10,392,000	25.1%
1970	12,663,000	21.9%
1980	14,726,000	16.3%
1990	17,169,000	16.6%
2000	19,169,000	11.6%
Est. 2008	21,197,569	10.6%

<http://populstat.info/Oceania/australc.htm>

The Indigenous population—mainland Aborigines and Torres Strait Islanders—was 410,003 (2.2% of the total population) in 2001, a significant increase from the 1976 census, which showed an indigenous population of 115,953.



Perth, Western Australia is now the most expensive city in Australia in which to live.

Indigenous Australians have higher rates of imprisonment and unemployment, lower levels of education, and life expectancies for males and females that are 17 years lower than those of other Australians.^[40]

In common with many other developed countries, Australia is experiencing a demographic shift towards an older population, with more retirees and fewer people of working age. A large number of Australians (759,849 for the period 2002–03^[48]) live outside their home country.

English is the national language,^[49] Australian English has its own distinctive accent and vocabulary. According to the 2001 census, English is the only language spoken in the home for around 80% of the population. The next most common languages spoken at home are Chinese (2.1%), Italian (1.9%), and Greek (1.4%). A considerable proportion of first- and second-generation migrants are bilingual. It is believed that there were between 200 and 300 Australian Aboriginal languages at the time of first European contact. Only about 70 of these languages have survived, and all but 20 of these are now endangered. An indigenous language remains the main language for about 50,000 (0.25%) people. Australia has a sign language known as Auslan, which is the main language of about 6,500 deaf people.



The Barossa Valley wine producing region of South Australia; fewer than 15% of Australians live in rural areas.

Australia has no state religion. In the 2006 census, 64% of Australians were listed as Christian: 26% as Roman Catholic, 19% as Anglican. 19% were listed as "No Religion" (which includes humanism, atheism, agnosticism, and rationalism); and a further 12% declined to answer or did not give a response adequate for interpretation. 5% were of non-Christian religions. As in many Western countries, the level of active participation in church worship is much lower than this; weekly attendance at church services is about 1.5 million: about 7.5% of the population.^[50]

School attendance is compulsory throughout Australia, starting at 6 years and ending at 15 years (16 years in South Australia and Tasmania, and 17 years in Western Australia), contributing to an adult literacy rate that is assumed to be 99%. The Programme for International Student Assessment, coordinated by the OECD, currently ranks Australia's education as the 8th best in the world: a significantly better ranking than the OECD average. [4]. Government grants have supported the establishment of Australia's 38 universities, and although several private universities have been established, the majority receive government funding. There is a state-based system of vocational training, higher than colleges, known as TAFE Institutes, and many trades conduct apprenticeships for training new tradespeople. Approximately 58% of Australians between the ages of 25 and 64 have vocational or tertiary qualifications,^[40] and the tertiary graduation rate of 49% is the highest among OECD countries. The ratio of international to local students in tertiary education in Australia is the highest in the OECD countries.^[51]

Culture

Since 1788, the primary basis of Australian culture has been Anglo-Celtic, although distinctive Australian features soon arose from the country's unique environment and the pre-existing indigenous culture. Over the past 50 years, Australian culture has been strongly influenced by American popular culture (particularly television and cinema), large-scale immigration from non-English-speaking countries, and Australia's Asian neighbours. The vigour and originality of the arts in Australia—literature, cinema, opera, music,

painting, theatre, dance, and crafts—have achieved international recognition.

Australian visual arts have a long history, starting with the cave and bark paintings of its indigenous peoples. From the time of European settlement, a common theme in Australian art has been the Australian landscape, seen for example in the works of Arthur Streeton, Arthur Boyd, and Albert Namatjira. The traditions of indigenous Australians are largely transmitted orally, and are closely tied to ceremony and the telling of the stories of the Dreamtime. Australian Aboriginal music, dance, and art have a palpable influence on contemporary Australian visual and performing arts. Australia has an active tradition of music, ballet, and theatre; many of its performing arts companies receive public funding through the federal government's Australia Council. There is a symphony orchestra in each state's capital city, and a national opera company, Opera Australia, first made prominent by the renowned diva Dame Joan Sutherland. Australian music includes classical, jazz, and many popular genres.

Australian literature has also been influenced by the landscape; the works of writers such as Banjo Paterson and Henry Lawson captured the experience of the Australian bush. The character of colonial Australia, as embodied in early literature, resonates with modern Australia and its perceived emphasis on egalitarianism, mateship, and anti-authoritarianism. In 1973, Patrick White was awarded the Nobel Prize in Literature, the only Australian to have achieved this; he is recognised as one of the great English-language writers of the 20th century. Australian English is a major variety of the language; its grammar and spelling are largely based on those of British English, overlaid with a rich vernacular of unique lexical items and phrases, some of which have found their way into standard English. Australian English has much less internal dialectal variation than either British or American English.

Australia has two public broadcasters (the ABC and the multicultural SBS), three commercial television networks, several pay-TV services, and numerous public, non-profit television and radio stations. Australia's film industry has achieved many critical and commercial successes. Each major city has daily newspapers, and there are two national daily newspapers, *The Australian* and *The Australian Financial Review*. According to Reporters Without Borders in 2007, Australia was in 28th position on a list of countries ranked by press freedom, behind New Zealand (15th) and the United Kingdom (24th) but ahead of the United States (48th). This low ranking is primarily because of the limited diversity of commercial media ownership in Australia; in particular, most Australian print media are under the control of News Corporation and John Fairfax Holdings.

Sport plays an important part in Australian culture, assisted by a climate that favours outdoor activities; 23.5% Australians over the age of 15 regularly participate in organised sporting activities.^[40] At an international level, Australia has strong teams in cricket, hockey, netball, rugby league, and rugby union, and it performs well in cycling, rowing, and swimming. Nationally, other popular sports include Australian rules football, horse racing, soccer, and motor racing. Australia has participated in every summer Olympic Games of the modern era, and every Commonwealth Games. Australia hosted the 1956 Summer Olympics in Melbourne and the 2000 Summer Olympics in Sydney, and has ranked among the top five medal-takers since 2000. Australia has also hosted the 1938, 1962, 1982, and 2006 Commonwealth Games. Other major international events held in Australia include the Grand Slam Australian Open



The Royal Exhibition Building in Melbourne was the first building in Australia to be listed as a UNESCO World Heritage Site in 2004.



Australian rules football was developed in Victoria in the late 1850s and is played at amateur and professional levels. It is the most popular spectator sport in Australia, in terms of annual attendances and club memberships.

tennis tournament, international cricket matches, and the Formula One Australian Grand Prix. Viewing televised sport is popular; the highest rating television programs include the summer Olympic Games, and the grand finals of local and international football (various codes) competitions.^[52]

Notes

1. ^ Australia also has a Royal anthem, *God Save the Queen (or King)*, which is played in the presence of a member of the British Royal Family when they are in Australia. In all other appropriate contexts, the National anthem of Australia, *Advance Australia Fair*, is played.^[53]
2. ^ English does not have *de jure* official status.^[54]
3. ^ There are minor variations from these three time zones, see Time in Australia.
4. ^ Australia describes the body of water south of its mainland as the Southern Ocean, rather than the Indian Ocean as defined by the International Hydrographic Organization (IHO). In 2000, a vote of IHO member nations defined the term "Southern Ocean" as applying only to the waters between Antarctica and 60 degrees south latitude.

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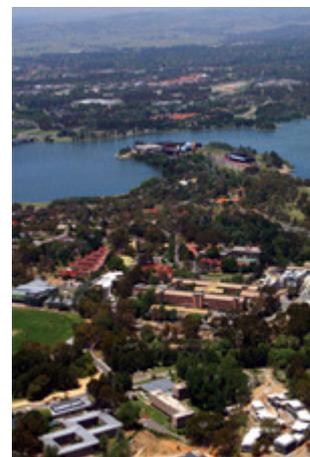
ANU Profile

The Australian National University is unique among its contemporaries as the only Australian university established by an Act of Federal Parliament, in 1946. It is also one of Australia's most research-intensive universities, with a high ratio of academic staff to students.

The University campus has over 200 buildings and occupies 145 hectares adjacent to the city centre of Canberra.

The University also has smaller campuses:

- Mt Stromlo Observatory (west of Canberra)
- Siding Spring Observatory (near Coonabarabran, western New South Wales (NSW))
- North Australia Research Unit (Darwin, Northern Territory)
- Kioloa (coastal campus near Bawley Point, on the NSW South Coast)



Some interesting facts and figures about our unique University:

A recent independent [quality review](#) of the University found it ranked among the world's best research universities, with 77 per cent of external assessors ranking ANU as one of the top 50 universities in their field in the world — including 44 per cent who rated ANU in the world's top 25 universities.

The Shanghai Jiao Tong University Institute of Higher Education's *Academic Ranking of World Universities* has ranked ANU ahead of every other university in the Southern Hemisphere two years in a row.

ISI Highly Cited, a ranking of researchers who have made fundamental contributions to their disciplines in the last 20 years, identifies 21 ANU researchers among the 50 Australians at the top of their field.

ANU has more Federation Fellows – lucrative fellowships awarded by the Australian Research Council – than any other Australian university.

ANU has more members of the Royal Society - the world's oldest scientific academy - on staff than any other Australian university.

The University has 13,487 students, representing 94 countries.

ANU has around 3,600 staff.

There are more than two million volumes – and one of the largest collections on the Asia-Pacific outside of the region - in the University's libraries.

A "green" campus, ANU has more than 10,000 trees within its grounds. In 2003 the University was awarded the Silver Greenhouse Challenge Award at the annual Australian Engineering Excellence Awards, placing it second of 800 signatories.

The oldest building on campus is Old Canberra House, built in 1913. It currently houses the Humanities Research Centre and Centre for Cross Cultural Research, but was once home to the British High Commission.

Summer research scholar program



Come to the ANU College of Engineering and Computer Science and enjoy 8-12 weeks of study on an exciting research project. Take advantage of the chance to work with some of the world's leading engineers and computer scientists at ANU and [NICTA](#) and you will also receive:

- Full board at [Burgmann College](#) from November until February
- A weekly tax-free allowance of \$135
- Return travel to Canberra

Closing date for applications: 31 August

[How to apply](#)

Offer is open to Undergraduate and Honours students who are currently enrolled at a university in Australia or New Zealand. Under some circumstances, other students who have been accepted into an ANU higher degree starting the following year, may be eligible to apply.



Professor Bob Williamson, Chair of the College Research Committee says: "The summer scholar program is an ideal opportunity for you to try your hand at research if you are thinking of possibly studying for a PhD. There are two key decisions you need to make - your choice of supervisor, and the project. The projects are grouped and described within our research themes below.

"You should do your homework on your supervisor - look up their home page; look up the papers they have written and the impact they have had ([Google Scholar](#)). Think about your supervisor as a mentor, not only for their academic credentials, but also for what they can bring to you in terms of life skills and their other interests. You can learn a lot from a homepage!

"If you are in to 'do-it-yourself' and have an idea for a research project, then you can create your own. You will need to be knowledgeable and creative, and capable of independent thought - all the attributes that make good researchers - to convince us that your project is worth pursuing. Again, do your homework first; check out the researcher as your potential supervisor by looking up their home page and discovering their research interests before preparing your one page proposal. And make sure you present a high-quality, well written proposal. A summer scholarship with one of our world class researchers will be of enormous value to you in a future research career.

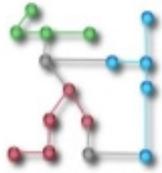
"Whether you choose an existing project, or create your own, I wish you the best of luck!"

[Choose Your Own Project](#)

Can't find what you are looking for? Then search our [website](#).

Research Themes

The College arranges its research and teaching into five themes. Summer research projects are organised within these themes.



Cooperative Systems

Complex ICT systems with the capability to coordinate and cooperate in serving society's needs.

Includes projects on: programming languages, software architecture, virtual machines, swarm robotics, sensor networks, telecommunications and wireless signal processing



Energy and Environment

Harnessing natural phenomena like solar and wind for sustainable energy production through a systems engineering approach.

Includes projects on: solar cells



Future Materials

Developing materials for applications to the human, biological and manufacturing systems of the future.

Includes projects on: nano technology



Thinking Systems

Exploiting computational intelligence, and building systems that have human-level intelligence.

Includes projects on: logic, AI, machine learning, games, diagnosis, planning, computer vision, robotics, data mining



Trust and Security

Storing, processing and communicating sensitive information, and guaranteeing trust and security.

Includes projects on: digital forensics, internet intrusion detection

Statistical Machine Learning Group

We develop techniques which can learn from data in a flexible and nonparametric fashion. This approach combines classical signal processing, statistics, pattern recognition, information theory, and artificial intelligence in a powerful way.



Organisation

The Statistical Machine Learning Group is part of the Computer Sciences Laboratory in RSISE at the ANU and part of NICTA, Canberra, Australia. Most members of the SML group are part of *RSISE and NICTA*.

Research

An important component of an intelligent system is its ability to adapt to differing user needs and environments. The Statistical Machine Learning (SML) program researches methods of creating intelligent devices with the ability to learn. Ultimately, the aim is to build intelligent systems that adapt to user needs without needing a programmer to encode rules about how to act. The systems researchers are constructing collect data from their environment, extract knowledge from data, and respond in an intelligent manner. The SML program focusses on research that can lead to products, processes and mechanisms that are increasingly usable; that hide sophisticated and complex processes behind simpler interfaces; that make use of information in vast databases; and that adapt to different environments and users. For example, researchers are working to develop systems whereby devices are able to learn how to recognise a user's voice or handwriting. These devices should learn how their environment works by analysing and understanding large sets of data. They should also learn how to interact with their environment in order to reach the objectives they have been assigned. The primary areas of interest to the program are

- kernel methods and statistics;
- rapid stochastic gradient methods;
- reinforcement learning and planning;
- information theory;
- bioinformatics.

See sml.nicta.com.au/ for a more detailed description.

Education

- [PhD Theses](#)
- [Teaching](#)
- [Honours/Summerscholars Projects](#)
- [Reading Group](#)

Prospective PhD Students

We are always looking for good PhD candidates with interest in Machine Learning. Possible backgrounds are an honor's or master's degree in physics, mathematics, computer sciences, or related field. Application forms are available online from the Australian National University. Please have a look at the [ANU](#) and [NICTA Education pages](#) for further details. It is an advantage for applicants to contact potential supervisors before submitting the form. Any [SML](#) researcher may be considered as a potential supervisor for this purpose. Have a look at their projects for further details. The PhD will be awarded by the [Australian National University](#), with [NICTA](#) possibly paying a top-up

scholarship. The PhD program is 3-4 years. Note that scholarships for non-residents of Australia are very difficult to get, and you would typically need a couple of relevant and high quality publications in the area already, or excellent results from a top university Masters degree.

[Some Projects](#)

Besides the [official SML/NICTA projects](#), there are many other projects in which SML is involved. A good way to find out is to go to the [list of people](#), and from there to the researcher's homepages.

[Contact - Academic Staff](#)

- [Bob Williamson](#), CSL Professor and NICTA Scientific Director
- [Alex Smola](#), CSL Adjunct Professor and NICTA Program Leader, [[apply](#)]
- [Marcus Hutter](#), CSL Associate Professor, [[apply](#)]

[All SML People](#)

See sml.nicta.com.au/People for an up to date and quite complete list of SML people and their research interests.

Statistical Machine Learning program

We develop techniques which can learn from data in a flexible and nonparametric fashion. This approach combines classical signal processing, statistics, pattern recognition, and artificial intelligence in a powerful way.



Introduction

An important component of an intelligent system is its ability to adapt to differing user needs and environments. NICTA's *Statistical Machine Learning* (SML) program researches methods of creating intelligent devices with the ability to learn. Ultimately, the aim is to build intelligent systems that adapt user needs without needing a programmer to encode rules about how to act.

The systems researchers are constructing collect data from their environment, extract knowledge from data, and respond in an intelligent manner. The SML program aims to develop ICT products, processes and mechanisms that are increasingly usable; that hide sophisticated and complex processes behind simpler interfaces; that make use of information in vast databases; and that adapt to different environments and users.

For example, researchers are working to develop systems whereby devices are able to learn how to recognise a user's voice or handwriting. These devices should learn how their environment works by analysing and understanding large sets of data. They should also learn how to interact with their environment in order to reach the objectives they have been assigned.

The primary areas of interest to the program are kernel methods and statistics; rapid stochastic gradient methods; reinforcement learning and planning; and bioinformatics.

Kernel Methods and Statistics

Kernels Methods are systems that describe similarities between objects, for example, the similarity of tv faces or the similarity between the pen strokes used to write a letter or character. The resulting information is used to find efficient methods of identifying a person (in the case of face recognition), or digit (in the case of optical character recognition). Kernel methods provide some unique ways of detecting unusual and novel items in a set of data.

Support Vector Machines (SVMs) is a method of classifying data using convex optimisation methods. In particular, text classification, optical character recognition, bioinformatics, and natural language processing.

Rapid Stochastic Gradient Methods

Gradient descent methods provide the engines that drive much machine learning. To cope with the flood of data we find ourselves in today, it often becomes necessary to approximate gradients from subsample of data. Unfortunately the noise this introduces into the gradient is not tolerated well by the classical gradient methods - with the exception of steepest descent, which however is very slow to converge.

We have used local step size adaptation to accelerate the convergence of stochastic gradient descent, culminating in our recently developed stochastic meta-descent (SMD) algorithm. SMD not only tolerate noisy gradients, but approaches the rapid convergence of a second-order method at low computational cost, allowing us to scale the algorithm to extremely large optimization problems.

Reinforcement Learning and Planning

Programming a machine to achieve complex tasks requires a considerable investment of resources. Reinforcement learning (RL) aims to create machines that program themselves to achieve specific goals. The designer defines goals with reward signals, which reinforce the desired behaviours of the machine.

The study of planning involves learning by way of models that describe a particular problem. Learning refers to behavioural learning by trial and error. The algorithms employed in learning and planning must consider the fundamental randomness of nature and, therefore, that actions do not always have predictable outcomes.

Applications include robotics, operations planning, resource management, logistics, and operation research.

Document Analysis and Understanding

The information revolution has led to an the explosive growth of unstructured documents available for analysis. Much information is also available in the context of law enforcement and intelligence scenarios. Such abundance can lead to a glut, meaning there is a need to understand the raw information and transform it into usable knowledge. Analysis and understanding will be accomplished via methods based on natural language processing and state of the art non-parametric statistics, such as kernels on structured data, Conditional Random Fields (CRFs), and low-dimensional data representation.

Bioinformatics

We concentrate on applications of machine learning techniques for building predictive models for determination of phenotype from genomic profiles. Moreover we work on methods for diagnosing cancer based on DNA microarray measurements.

ABOUT NICTA

National ICT Australia (NICTA) was established in 2002. We are a national organisation with five laboratories in four cities: Melbourne, Sydney, Canberra and Brisbane.

Our objective is to become a world-class Research Institute and Centre-of-Excellence in science and innovation. NICTA brings together many of Australia's and the world's top researchers in ICT.

NICTA uniquely combines excellence in research, education, commercialisation and collaboration.



We work in close collaboration with industry and other research institutions to solve problems and make breakthroughs in ICT which can be put to use for public benefit.

NICTA is an important part of Australia's innovation system and seeks to generate new opportunities for Australian industry. Our focus is on use-inspired basic research to address the technology challenges facing industry, community, and the national interest.

View NICTA's 30 second video [MPEG-4](#) (1.5MB) or [Windows Media Video](#) (1.3MB)

NICTA's Virtual World 2020 Vision

NICTA is developing its '2020 vision'. To see how the future may look and how technology will influence new products and services, check out our Second Life presentation to the International Scientific Advisory Group (ISAG) on 30 August this year.

[Quicktime Movie](#) (14MB) [Windows Media Video](#) (18MB)
ISAG helps generate a long-term strategic vision for NICTA.

Funding of NICTA

NICTA is funded by the Australian Government through the Department of Broadband, Communications and the Digital Economy (DBCDE) and the Australian Research Council (ARC).

NICTA Research Themes and Business Areas

NICTA's [Research Themes](#) are the disciplines in which we have strong research capabilities.

Our key themes are:

- Embedded Systems
- Networked Systems
- Making Sense of Data
- Managing Complexity

NICTA's [Business Areas](#) are the market sectors which provide a focus for NICTA's research activity.

Our key business areas are:

- Biomedical and Life Sciences
- Intelligent Transport Systems
- Safety and Security
- Environmental Management
- Mobile Systems and Services
- Software Infrastructure

NICTA members

NICTA members include the Australian Capital Territory Government, the New South Wales Government, the University of New South Wales and the Australian National University.