



Australian Government



Jobs and Skills Australia

# Emerging Roles

Report

November 2024



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# Overview

## Introduction

The way we work changes over time. New technologies are introduced, innovations are taken up and become wide-spread, consumer preferences evolve and the way we manage and respond to our environment changes. Often, new skills and ways of working are introduced into existing roles, but sometimes entirely new roles are created.

In 2020, a [report on Emerging Occupations](#) was published by the National Skills Commission which identified 25 emerging occupations in themes such as Data Analytics, Emerging Business Practices, and Healthcare. This year, Jobs and Skills Australia conducted research to identify new insights on emerging roles in the labour market and has taken a broader approach, both qualitatively and quantitatively in combination with stakeholder consultation<sup>1</sup>.

The purpose of this report is to identify and showcase trends in the evolving Australian labour market. The report also provides intelligence on market demand, skills composition required by employers, and other demographic characteristics to create a holistic picture of emerging roles. Understanding the changing world of work is important in supporting job seekers, students and career advisors and in developing policy for employment services, Vocational Education and Training (VET) and Higher Education.

Jobs and Skills Australia has analysed evidence of increased labour market demand and identified four key themes. These include the Net Zero, Health, Care and Medical, Data and Technologies (including AI) and Science and Engineering. We have identified emerging roles using job titles, skill requirements and other job attributes from online job advertisements (ads) and have validated them against Census of Population and Housing 2021 micro-data. Within the scope of this report, 37 emerging roles in the four key themes have been identified. Of which, 9 roles have been accompanied by a comprehensive profile as exemplars.

The final section of the report focuses on Artificial Intelligence (AI) skills across the labour market including how AI skills are being incorporated into existing occupations and leading to the development of new emerging roles.

## What are emerging roles?

Emerging roles are those that have appeared in Australian job market data for the first time in recent years or are growing quickly from a small base. They are roles that are becoming more prominent in their evolving fields of work or industries. They also represent a new field of work or a distinct specialisation within an existing occupation.

It is important to note that emerging roles are not simply a new title for a role that has existed for some time. They are also not a prediction of a role that might appear in the future.

Emerging roles identified in this report reflect insights derived from current Australian job market data and other relevant data sources. They describe work that Australians are doing now.

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<sup>1</sup> This publication is titled 'Emerging Roles', because the trends it identifies are distinct from 'occupations' as defined by Australia's official taxonomy – the [Australian and New Zealand Standard Classification of Occupations \(ANZSCO\)](#). The emerging roles outlined in this report may not meet workforce size and other guidelines designed to ensure statistical reliability in ANZSCO. At the time of writing, the Australian Bureau of Statistics (ABS) is conducting a comprehensive review which includes identifying new occupations to reflect the contemporary labour market and better meet stakeholder needs. The emerging roles outlined in this report are not intended to counter or contradict ANZSCO, but rather represent a different way of discussing workforce trends.

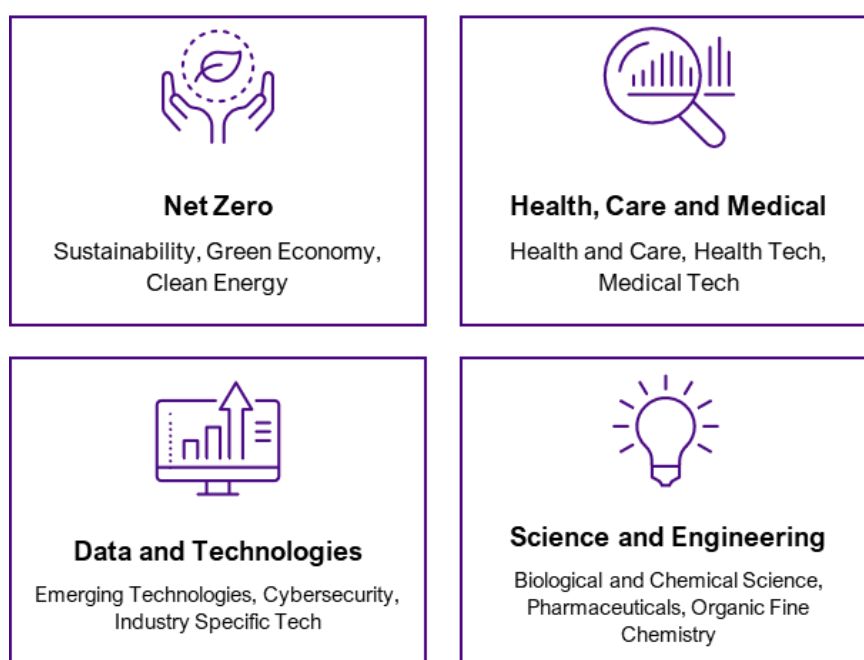
# Research methodology

Jobs and Skills Australia applied a broad approach to identify new emerging roles in the labour market. The methodology combined both quantitative and qualitative analyses as well as ongoing consultation with key stakeholders. The methodology consisted of 4 phases, exploration, analysis, evaluation and validation.

## Exploration

Research began with an environmental scan to identify key themes where there is evidence of increased market demand over the last five years. This was conducted using different data sources, including data on intellectual property, research grants, international classifications, VET data and internet job advertisements<sup>2</sup>.

Figure 1: Key themes



## Analysis

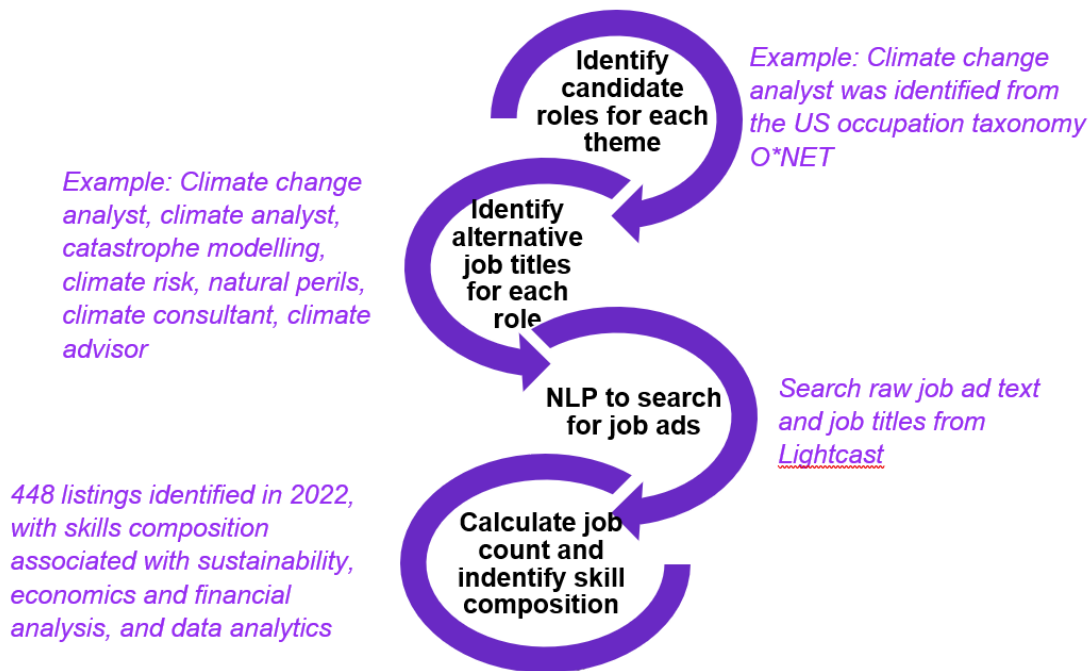
Evidence of emerging roles associated with each key theme was then collected in internet job ads, international taxonomies, and other survey data. This first step was to identify potential candidate roles in each key theme, as shown in Figure 1. The process for identifying candidate roles differed by data availability or source. We then identified alternative job titles associated with each role. In the next step, we developed a Natural Language Processing (NLP) model to search for each role using millions of online Australian job ads. The number of online job ads for each candidate and its skills composition were then identified and assessed to ensure that potential emerging roles are substantially different from well-established roles in the labour market or are a distinct specialisation,

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<sup>2</sup> Data sources included: Intellectual Property Government Open Data (IPGOD), Australian Research Council Grants (ARC Data), the US occupation taxonomy (O\*NET), the European Commission's European Skills, Competences, Qualifications and Occupations taxonomy (ESCO), competency data from Training.gov.au; and online job advertisement data from Lightcast for the period between 2018 and 2022. Detailed information on each data source is given in Appendix A at the end of the report.

involving tasks which are new or emerging. This analysis process is detailed in Figure 2, giving the example of Climate Change Analyst.

**Figure 2: Analysis methodology summary**



## Evaluation

The evaluation involved a comprehensive assessment of each potential emerging role, both qualitatively and quantitatively. This included an NLP algorithm to analyse how similar the recommended emerging roles were to existing, well-established roles in the labour market. Using an NLP algorithm helped eliminate potential duplication when introducing existing roles or their strict subset.

The evaluation process followed the principles outlined in Figure 3.

**Figure 3: Principles for validation**



## Evaluation principles

### Distinct from well-established roles in the labour market

Emerging roles represent a new field of work, the use of an established skill in a new context or a distinct specialisation within an existing role.

### Requiring new, emerging skills or a diverse skill set

One important criterion of emerging roles is that they require a new or diverse skill set. This could include skills new to the whole labour market, or a new blend of established skills not traditionally used together.

### Growing in demand

Emerging roles have appeared in Australian labour market data for the first time in recent years or are growing quickly from a small base. They are formed based upon insights derived from the current labour market and other relevant data sources.

### Reasonably large size

Emerging roles must have occurred frequently enough in job ads (at least 50 job ads in 2022 and at least 100 job ads over the past 5 years, between 2018-2022).

## Validation

Finally, validation of the emerging roles against data on the Australian population enriched our understanding of how emerging roles were recognised and reported in the labour market.

Jobs and Skills Australia worked with the ABS to access microdata from the Census of Population and Housing 2021 to confirm the presence of the roles in the labour market.

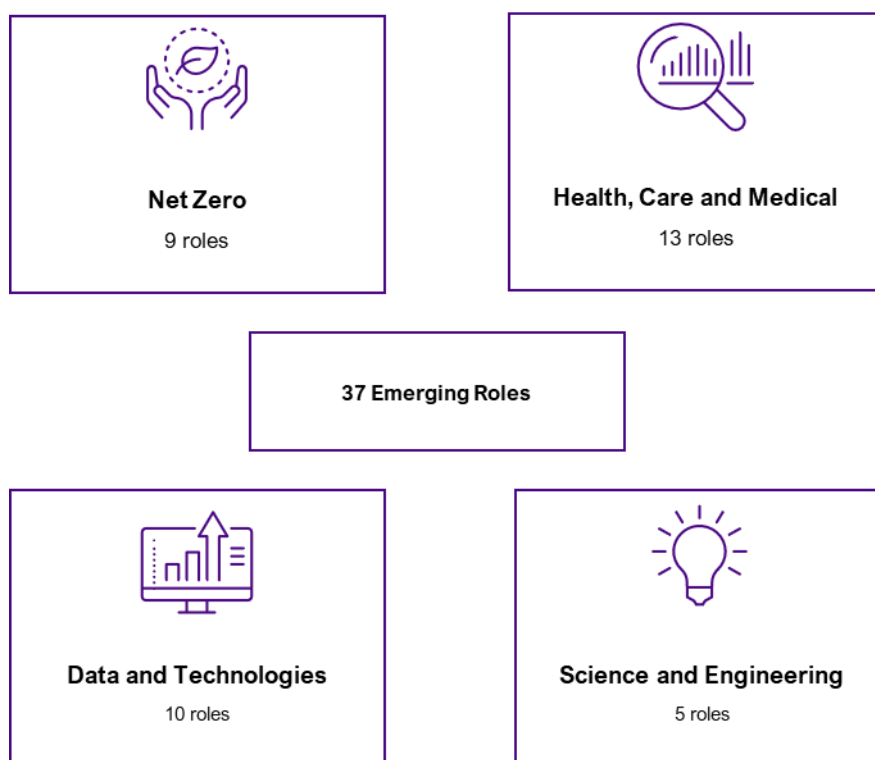
This process also allowed us to estimate the size of the workforce for each emerging role and to determine other insights including demographic factors such as age, gender, education and earnings.

# Results

Jobs and Skills Australia has identified a total of 37 emerging roles across four key themes. The top-ranking theme is Health, Care and Medical, which includes 13 emerging roles, followed by Data and Technologies with 10 roles. Within the Data and Technologies theme, 2 emerging roles were categorised as emerging cutting-edge technologies, Artificial Intelligence and Quantum Computing. The Net Zero theme had 9 emerging roles, while the Science and Engineering theme had five.

Figure 4 shows a summary of the emerging roles identified by theme.

Figure 4: Result summary



## Health, care and medical

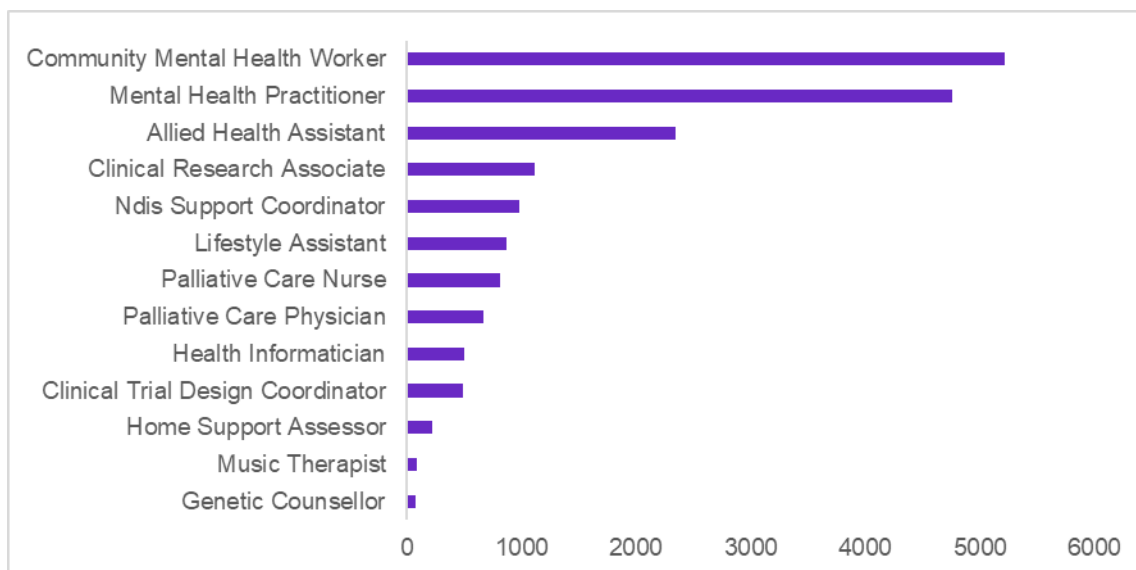
According to the 2021 Census, there were 1.7 million people working in the Health Care and Social Assistance industry in Australia. Employment in this industry has grown by 26% over the past five years and is projected to grow by 16% over the next five years. Most workers have tertiary qualifications, with 45% holding a university qualification and 35% holding a VET qualification.<sup>3</sup> There has been a growing number of new qualifications and skill sets in health areas leading to new roles being identified. Given this context, it is not surprising that the Health, Care and Medical theme had the largest number of emerging roles among the four key themes, with 13 emerging roles identified.

These roles are highlighted in Figure 5 below, which lists emerging roles identified within the theme by the number of online job ads in 2022. Community Mental Health Worker and Mental Health Practitioner had the highest numbers of online job ads, with about 5,200 and

<sup>3</sup> Jobs and Skills Australia, Labour Market Insight. <https://labourmarketinsights.gov.au/industries/industry-details?industryCode=Q#:~:text=Employment%20in%20Health%20Care%20and,five%20years%20to%20November%202026.&text=Source%3A%20ABS%2C%20Labour%20Force%20Survey%2C%20Detailed%2C%20November%202021,the%20five%20years%20to%202026.>

3,800 job ads in 2022, respectively. Allied Health Assistant had more than 2,300 job postings in 2022.

**Figure 5: Emerging roles in Health, Care and Medical by online job ad counts in 2022**



Source: Lightcast data 2022, Jobs and Skills Australia's analysis.

The case studies below explore two emerging roles within the Health, Care and Medical theme.

The demand for online job postings in the Music Therapist role saw a substantial growth of nearly fourfold between 2018 and 2022. The role also requires a diverse skill set, which includes a combination of medical and musical knowledge and skills. About 90% of job postings for Music Therapist mention Music as a key skill to perform the job, while Music Therapy and Mental Health Management were mentioned in 73% and 20% of online job postings, respectively (see the box below).

In the Census of Population and Housing 2021<sup>4</sup>, 414 people reported working as a Music Therapist.

<sup>4</sup> Samples for each of our emerging roles from Census were derived by analysts using free-text responses provided by survey respondents to the following three questions.

1. *In the main job held last week, what was the person's occupation?*
2. *What are the main tasks that the person usually performs in that occupation?*
3. *What are the main goods produced or main services provided by the employer's business?*

Analysts ensured that each person's response was allocated to a single emerging role and counted only once.

It is important to note that lockdowns were in place across most states and territories throughout the Census response period which likely affected employment responses such as the rate of full-time employment, hours worked, and other figures cited in this publication. The Census employment and occupation questions are asked in reference to a person's status the week prior to the Census. For example, the question for determining a person's employment circumstance asks if they had a job of any kind in the last week.




### Case study: Music Therapist


**Music Therapists plan and deliver music therapy interventions to improve physical, psychological, cognitive, or behavioural skills and function. Registration or licensing may be required.**

#### Workforce profile (Census of Population and Housing 2021)


##### Workforce size

 414 people


##### Female share

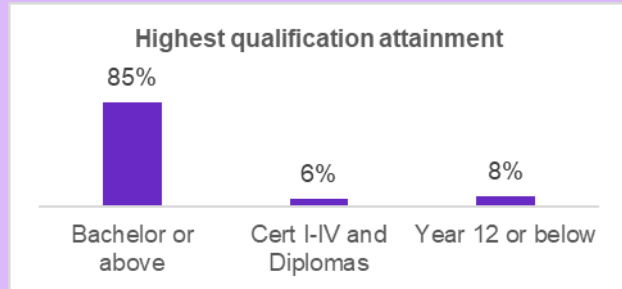
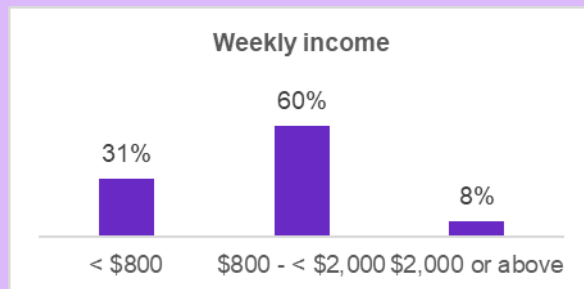
 71% of female

##### Working age

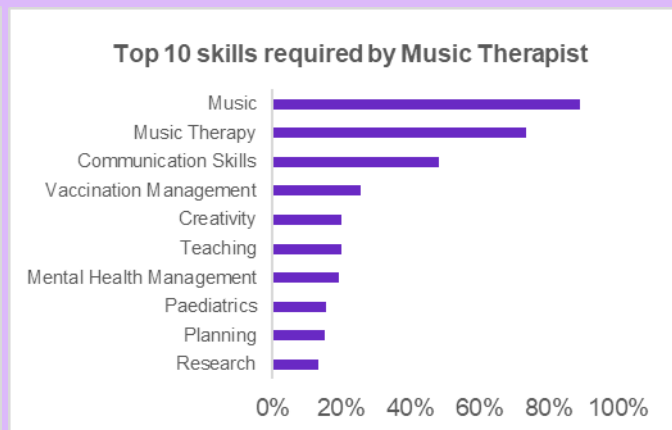
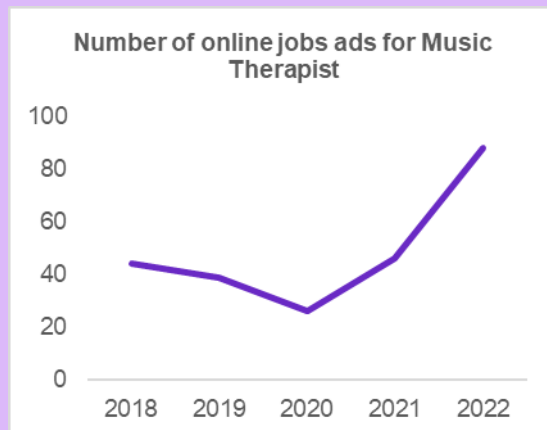
 61% aged 25 - 44

##### Full time/part time

 28% worked full time



#### Demand from online job ads



#### **Sample job ad text:**

We are looking for a full-time registered music therapist or newly graduated music therapy student to start with us as soon as possible. You will be conducting home visit music therapy sessions for children and adults with special needs. The therapist we are looking for is warm, engaging and has a genuine care for the client and a passion for music therapy. We want someone who is dependable, reliable, and willing to stay with us long term.

Requirements: Must have a Music Therapy qualification and be registered with AMTA to apply.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis.

The majority of the reported workforce for Music Therapist is female (more than 70%) and the role has a young workforce, with more than 60% of employees aged between 25 and 44 years old. In most cases the role requires a higher education pathway with almost 85% of the reported workforce having a Bachelor degree or above. However, people working in this role tended to work part-time. Only 28% of the workforce reported a full-time working arrangement. In terms of weekly income, 31% earned less than \$800,<sup>5</sup> while majority of the workforce in this role earned between \$800 and just below \$2,000 (60%) and 8% had an income of at least \$2,000 per week.


### Case study: NDIS Support Coordinator

<sup>5</sup> This was around the national median personal income reported in Census 2021, \$805 per week. ([Income and work: Census, 2021 | Australian Bureau of Statistics \(abs.gov.au\)](https://www.abs.gov.au/australian-bureau-of-statistics/news/articles/2022/04/income-and-work-census-2021))


**NDIS Support Coordinators work with clients to help them understand their NDIS plan, coordinate and plan support for clients, connect clients with supports and services, establish and maintain supports for clients, report to the NDIA, prepare clients for unexpected events; and, provide coaching and capacity building for independence.**

**Workforce profile (Census of Population and Housing 2021)**


Workforce size

 1,260 people


Female share

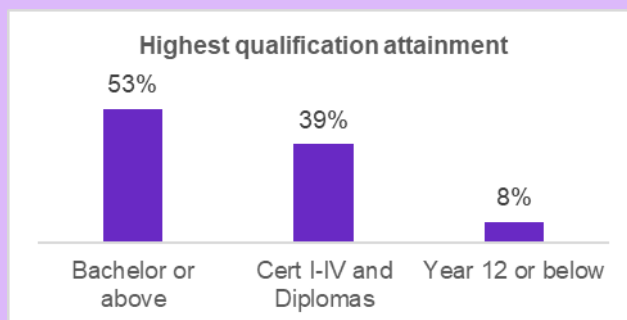
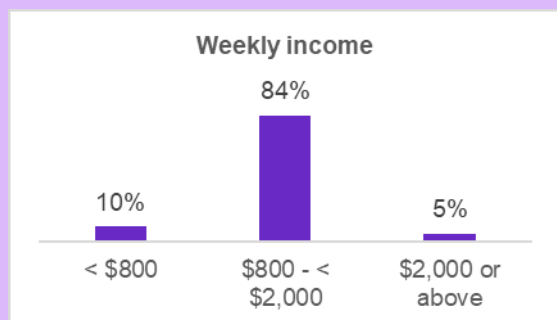
 82% female

Working age

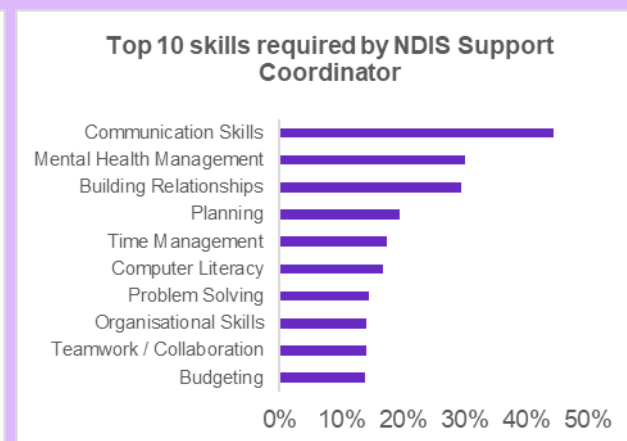
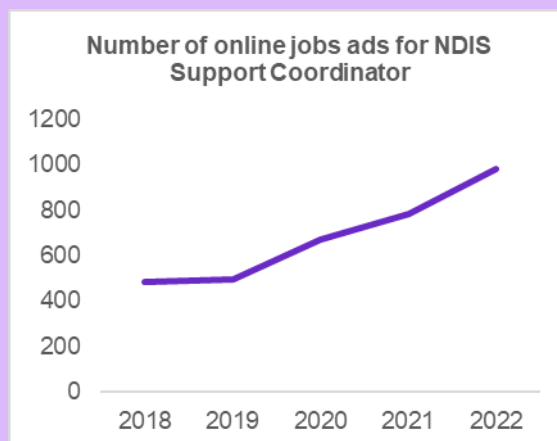
 56% aged 25-44

Full time/part time

 62% worked full time



**Demand from online job ads**



**Sample job ad text:**

Assist clients to coordinate and implement supports/therapies in line with their NDIS funding and goals, assist with engaging in mainstream support, assist with plan reviews and change of circumstance submissions, assist with home modification applications.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis

NDIS Support Coordinator is another emerging role in the theme. This emerging role shows the impact of the National Disability Insurance Scheme (NDIS), in current disability support and employment for Australians. The NDIS, introduced in Australia, was legislated in 2013 and has since undergone trial and transition phases, rolling out across Australia by 2020. This has led to demand for NDIS Support Coordinators, resulting in increased employment opportunities in the care and support sector. The *NDIS Coordinator of Supports* skill set was introduced into the VET system in 2022.

Online job ads show a high demand for the role, the number of job postings almost doubled over a five-year period (2018-2022). It's important to note that the roll out of the NDIS also occurred over this period and we may not continue to see strong growth in this role once the demand has peaked. Data from online job ads also indicate a diverse skill set is required for the role, including both core skills such as communication, building relationships and time

management; and specialist skills such as mental health management, case management and budgeting.

In the Census of Population and Housing 2021, 1,260 people could be identified as working as NDIS Support Coordinators. The counts extracted from Census data do not necessarily align with the number of providers in Support Coordination<sup>6</sup> because the two measures are different. For example, an NDIS provider is a person, business or organisation whereas the Census data are at person level, NDIS providers may employ people in a range of different roles; and, people working as NDIS Support Coordinators may describe their role in different ways, with language in the sector yet to crystallise. Like Music Therapists, the majority of the reported workforce for this role was female (more than 80%) and more than half of people working in the role were aged between 25 and 44 years. The majority of the workforce were working in a full-time capacity (62%). In terms of the highest qualification attainment, there is a mixture of both Higher Education (53%) and VET (53%) qualifications. The majority of the workforce (89%) earned close to or more than the national average (\$805 per week) and 5% had an income of \$2,000 per week or above.

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<sup>6</sup> As at 31 December 2021 there were 2,744 active providers in support coordination.  
<https://dataresearch.ndis.gov.au/media/3405/download?attachment>

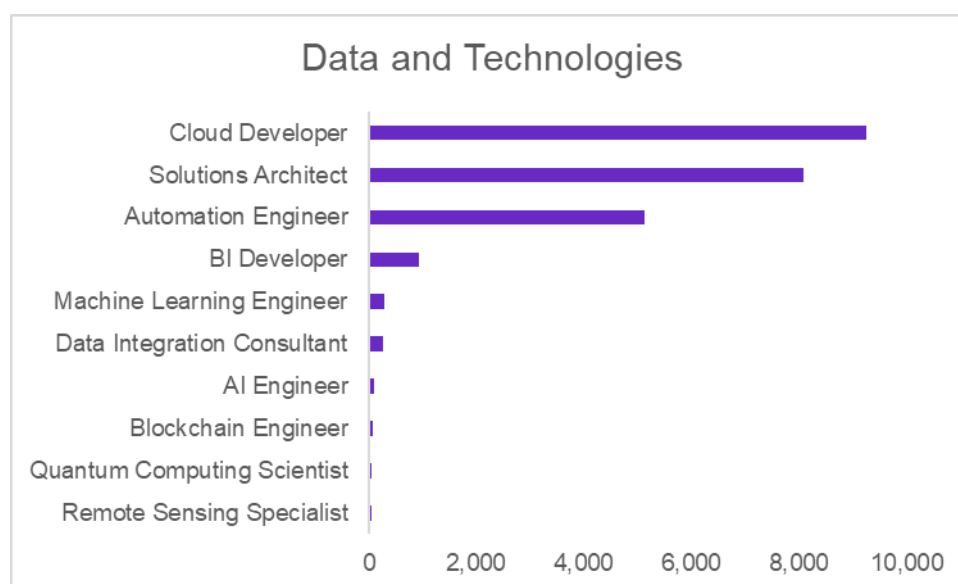
## Data and technologies

Within the Data and Technologies theme, 10 emerging roles were identified. Among these, two were associated with emerging cutting-edge technologies - Artificial Intelligence (AI) Engineer and Quantum Computing Scientist. Although these roles have significantly lower demand compared to other roles within the theme, they were identified due to rapid advances in technology uptake over the last few years.

The demand for each role, as captured by the number of online job ads in 2022, is presented in Figure 6.

The adaptation of data and technology has not only changed the way we work, but also created new types of jobs. Solution architecture, as an example, is a dynamic and evolving field that requires constant learning and adaptation to new technologies, methodologies, and best practices. Demand for this role was strong, with 8,000 job postings in 2022. Similarly, Automation Engineer and Cloud Developer had large numbers of online job ads (about 5,000 and 9,000, respectively).

**Figure 6: Emerging roles in Data and Technologies by online job ad counts in 2022**



*Source: Lightcast data 2022, Jobs and Skills Australia's analysis*

Some of the emerging roles identified in the Data and Technologies theme had relatively few online job listings in 2022, but were included because they required new skills and reflect emerging technologies. These included Blockchain Engineer and Quantum Computing Scientist. While there were only 50 listings for Remote Sensing Specialists, these jobs were concentrated in agriculture and mining, suggesting this role has traction in these industries.

Two case studies in the boxes below present details on demand over time and skills listed in online job postings for emerging roles in this topic.

## Case study: Quantum Computing Scientist

Quantum Computing Scientist undertakes research on computational systems that rely on quantum mechanics and help design, test and implement quantum technologies.

### Workforce profile (obtained from Census of Population and Housing 2021)

#### Workforce size



54 people

#### Female share



11% female

#### Working age

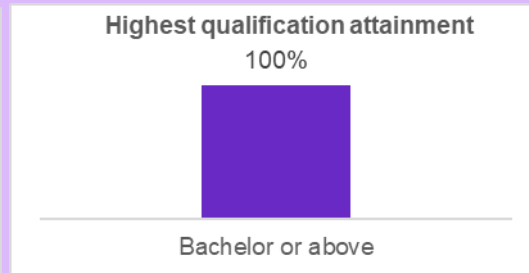
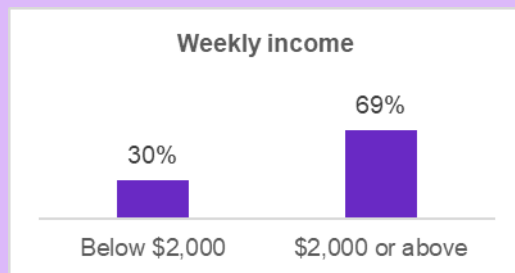


83% aged 25-44

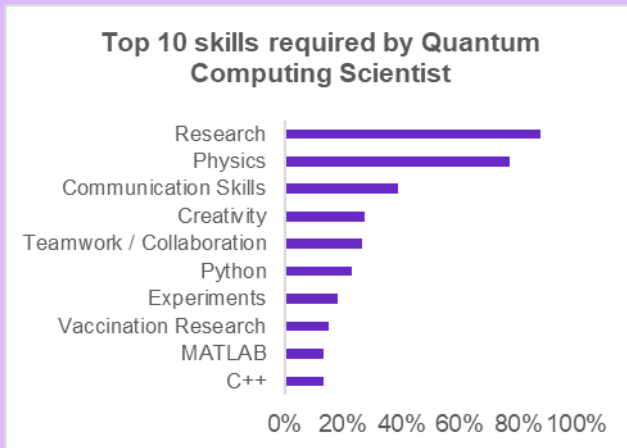
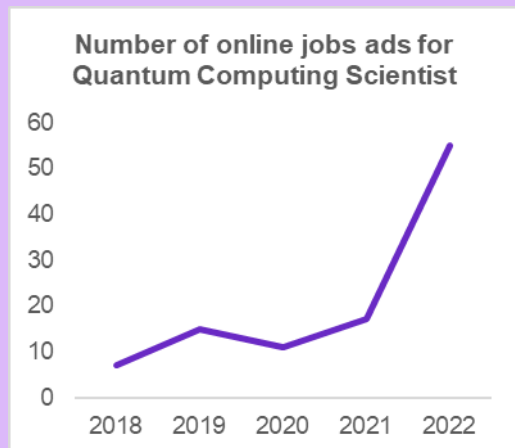
#### Full time/part time



93% working full time



### Demand from online job ads



#### Sample job ad text:

We are looking for a Research Scientist and Quantum Software Engineer. The scientist in this position is expected to conduct research and prototype development relevant to the quantum system development lifecycle, working together with the Quantum team. The key duties are to create software engineering methods, focusing on requirements, co-designing with conventional software computing, and aligning software testing with research strategies in novel and practical ways, collaborate with colleagues and customers, and keep a healthy and safe work environment. The deliverables of this role are research-driven by impacts, including high-quality scientific papers, technical reports, and usable systems for customers or the community.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis

Quantum computing is an advancing technology that has the potential to revolutionise data processing. It can perform certain calculations exponentially faster than classical computers, impacting fields such as healthcare, transportation, finance, and security<sup>7</sup>.

Quantum Computing Scientist is an emerging role driven by emerging skills and technologies, with multiple applications across industries. There has been a significant increase in demand as shown by online job ads, which started from a very low base in 2018, and increased by almost 700% after 5 years, but remained low at 55 listings in 2022.

Unsurprisingly, the Census of Population and Housing 2021 indicated a small workforce (54 people). This workforce was male dominated (11% female) and primarily comprised of people aged between 25 and 44 years (83%). The majority of the workforce was working in a full-time capacity (93%). The entire workforce held a Bachelor level degree or above. Aligned with a high skilled workforce, income for this role was also high, with 69% of the workforce earning \$2,000 or more per week.

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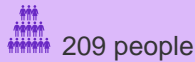
<sup>7</sup> [The Emergence of Quantum Computing What it Means for Technology and Society \(linkedin.com\)](#)

## Case study: Machine Learning Engineer

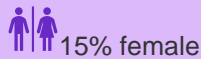
**Machine learning engineers design, develop, modify, test, implement and install machine learning algorithms and models into software. These algorithms enable computers to learn from data to identify trends, patterns and actionable insights to enable strategic, operational, and commercial objectives.**

### Workforce profile (Census of Population and Housing 2021)

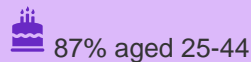
#### Workforce size



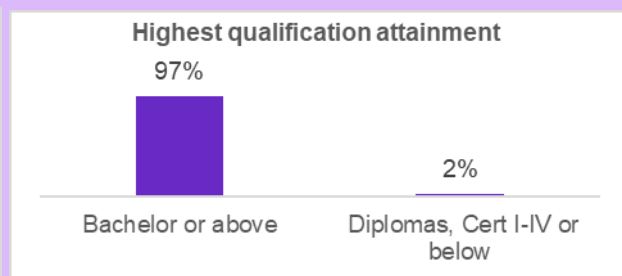
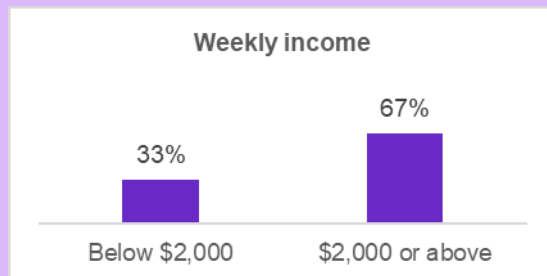
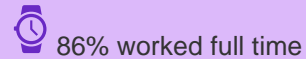
#### Female share



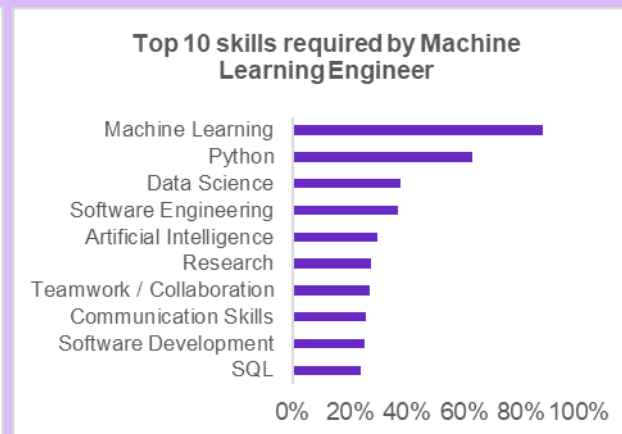
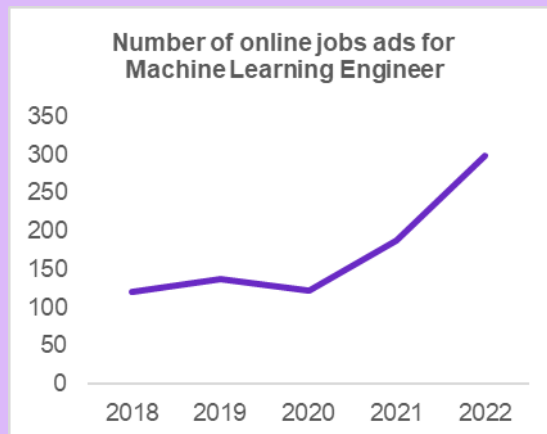
#### Working age



#### Full time/part time



### Demand from online job ads



### Sample job ad:

We are seeking a Machine Learning Engineer to take on the responsibility of crafting, building, and deploying machine learning models tailored to address business challenges. In this pivotal role, you will collaborate closely with data analysts, data engineers, and business stakeholders.

- Design, develop, and deploy machine learning models into production. Collaborate with data stakeholders to understand requirements, transform data science prototypes into scalable solutions as well as delivering machine learning or AI-driven solutions.
- Improve and maintain existing machine learning/ artificial intelligence systems and services, ensuring reliability and performance. Conduct data analysis and feature engineering to improve model accuracy.
- Develop scalable and efficient machine learning/artificial intelligence models and pipelines and maintain machine learning operations pipelines, contributing to the lifecycle of projects from inception to production.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis.

Machine Learning Engineer is a separate but related emerging role to Data Scientist. While Data Scientists are focused on interpreting data and drawing actionable conclusions, Machine Learning Engineers focus on writing code and deploying machine learning products. Data Scientists and Machine Learning Engineers often work closely together, but on different parts of a process.

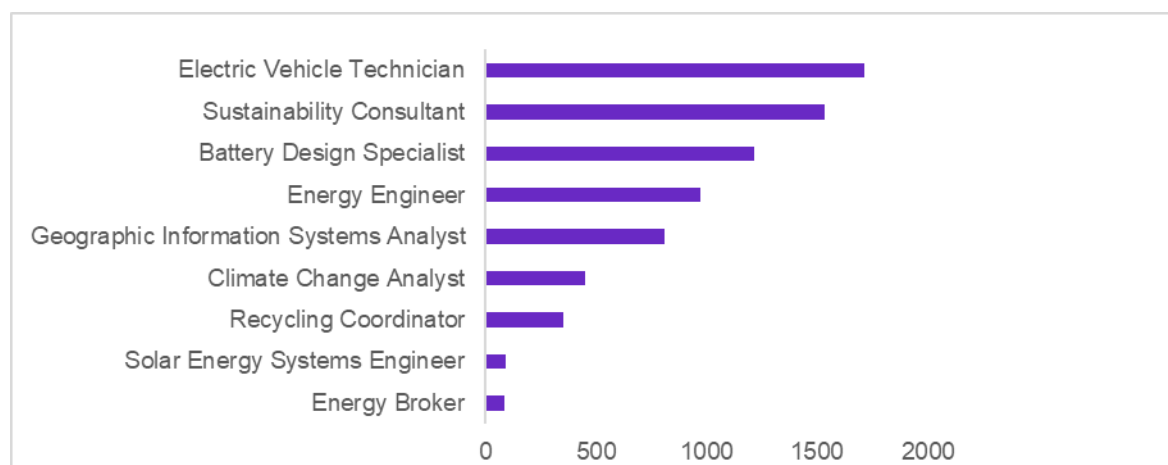
Taking online job ads as an indicator of demand size, the number of job postings increased almost three times over between 2018 and 2022. Unsurprisingly, the top skills listed by employers for the role included specialised tools and techniques in the field, such as Machine learning, data science, Python, software engineering and artificial intelligence (AI).

More than 200 people reported their occupation to be Machine Learning Engineer in the 2021 Census. Of these, only 15% were female. The role was primarily represented by a young workforce, with 87% aged between 25 and 44. The majority of the workforce reported working in a full-time capacity. Like Quantum Computing Scientist, Machine Learning Engineer is a highly skilled and highly paid role, with 97% of the workforce having a Bachelor or above, and 67% receiving at least \$2,000 per week.

## Net Zero

Jobs and Skills Australia’s recent study, *The Clean Energy Generation*<sup>8</sup>, showed the transition to a net zero economy will change the skills and responsibilities of existing roles and lead to the emergence of new roles. The report suggested emerging roles are mostly related to new fuels and storage, transport and energy performance. In this study, we identified 9 emerging roles under the Net Zero theme, Figure 7 gives the number of online job ads in 2022 for each.

**Figure 7: Emerging roles in Net Zero by online job ad counts in 2022**



Source: Lightcast data 2022, Jobs and Skills Australia’s analysis

Electric Vehicle Technician had the highest number of online job ads in this theme with more than 1,700 job postings, which reflects a strong growth in demand for this environmentally friendly vehicle in the market. As suggested by the *Clean Energy Generation* report, demand for specialist electric vehicle mechanics will increase, as will the demand for mechanics to work across both vehicle types.

Sustainability Consultant followed in second place with over 1,500 job postings in 2022, reflecting an ongoing transformation towards sustainable development. This is aligned with findings from the *Clean Energy Generation* report which indicated that the most common green skills groups were Engineering, Sustainability and Renewable Energy, where Sustainability Consultant was one of the fastest growing job titles in the labour market.

<sup>8</sup> [The Clean Energy Generation | Jobs and Skills Australia](#)



It is important to note that these emerging roles were identified using a data driven approach and they are closely aligned with the recommendations from different stakeholders that were consulted as part of the Clean Energy Generation study.

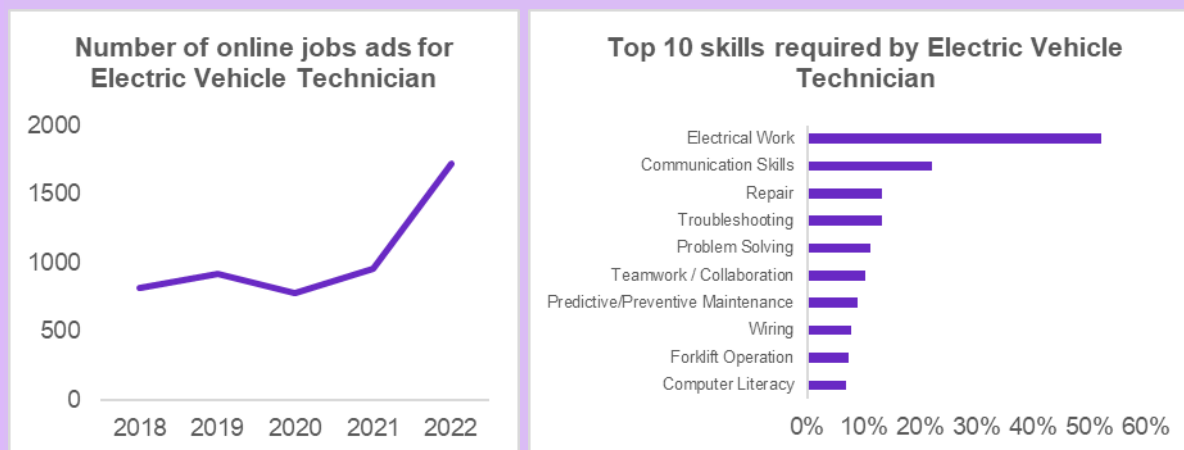
The case studies below present profiles for two emerging roles identified within the theme. As mentioned above, Electric Vehicle (EV) Technician had strong demand in the market and experienced a significant increase in the demand over time, with online job postings doubling between 2018 and 2022. In terms of skill requirements, aside from traditional skills required by vehicle mechanics like repairing and troubleshooting, other specialised skills such as electrical work and wiring are required in the majority of job ads for EV Technician.

### **Case study: Electric Vehicle Technician**

***Electric Vehicle Technicians specialise in repairing and maintaining electric vehicles. They are responsible for diagnosing and fixing problems with the vehicle’s electrical wiring and electronic components, including the battery, motor, and charging system. They also perform routine maintenance tasks such as tire rotations.***

Workforce data is not available for this role due to a small number of Australians reporting working as Electric Vehicle Technician in Census 2021. With sales of EVs increasing, we may see more people reporting working in this role in future.

#### **Demand from online job ads**



#### **Sample job ad text:**

##### **Responsibilities:**

- Perform routine servicing, maintenance and inspections on electric vehicles to ensure they are in optimal working condition.
- Identify and troubleshoot basic electrical and mechanical issues with electric vehicles and perform necessary repairs or replacements.
- Ensure that all electric vehicles meet safety standards and regulatory requirements.
- Maintain accurate records of maintenance, repairs, and inspections for each vehicle.
- Respond to emergency calls for vehicle breakdowns or accidents, providing timely assistance and repairs.
- Manage inventory of spare parts and equipment needed for vehicle repairs and maintenance.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia’s analysis.

While the number of Australians reporting working as EV Technicians in the 2021 Census remained low, significant increases in sales of electric vehicles in the intervening years may indicate that this role is likely to grow.

Battery Design Engineer is another case study in the Net Zero theme. The rapid increase in demand for clean energy and battery storage<sup>9</sup> has been reflected in the number of job

<sup>9</sup> [The Clean Energy Generation | Jobs and Skills Australia](#)

postings for Battery Design Engineers, with more than 1,200 job postings in 2022, double the number in 2018.

This emerging role combines skills from multiple disciplines including electrical engineering, chemical engineering, and mechanical engineering. The role requires a diverse skill set, with job postings referring to skills including electrical engineering, communications, project management and problem solving.

A small number of people reported working as Battery Design Engineers in the 2021 Census (185 people). The role had a mostly male workforce (89%) and encompassed a diverse range of age groups, with the majority falling within the 25-44 bracket (65%). In terms of working arrangements, 84% reported working in a full-time capacity. Battery Design Engineer is also a highly skilled role, with 91% of the workforce having a Bachelor degree or above. Weekly income varied between high and medium ranges, with 41% receiving at least \$2,000 per week.

## Case study: Battery Design Engineer

**Battery Design Engineers are responsible for designing the battery cells, modules, and packs that power everything from electric vehicles to portable electronics. They work with a team of engineers to develop new battery technologies and improve existing ones. They also work with manufacturers to ensure that batteries are produced to meet quality standards and specifications.**

**Workforce profile (obtained from Census of Population and Housing 2021)**

### Workforce size



185 people

### Female share



11% female

### Working age

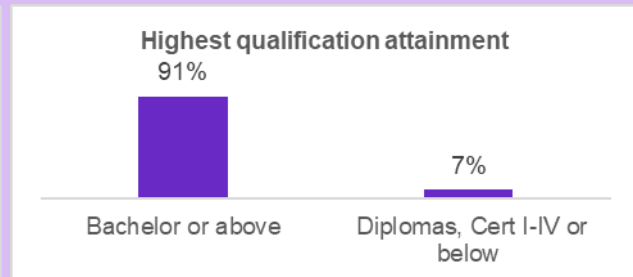
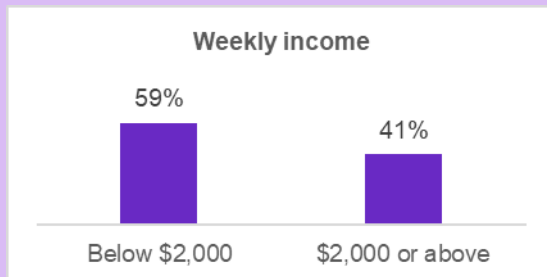


65% aged 25-44

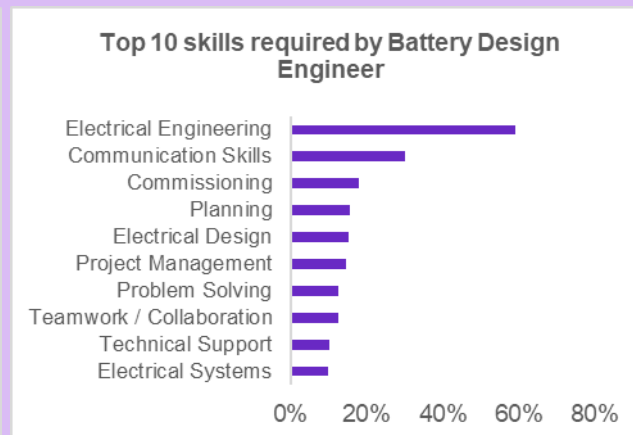
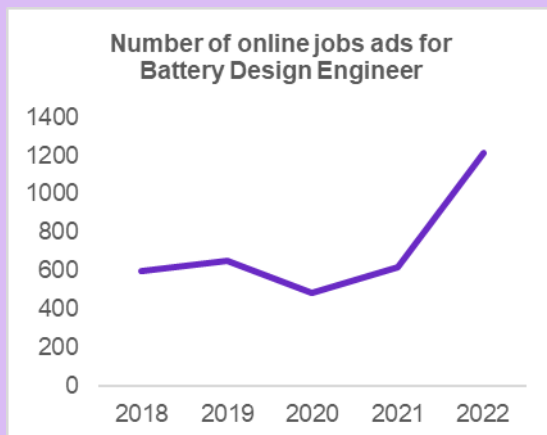
### Full time/part time



84% worked FT



## Demand from online job ads



### Sample job ad text:

As an Electrical Engineer specialising in Battery Energy Storage Systems (BESS), you will play a critical role in the design, implementation, and optimization of BESS projects. You will be responsible for ensuring the efficient and reliable operation of battery systems, contributing to the advancement of renewable energy integration, grid stability, and energy management solutions. This position requires a strong foundation in electrical engineering principles, coupled with expertise in battery technologies and energy storage systems.

#### Key responsibilities:

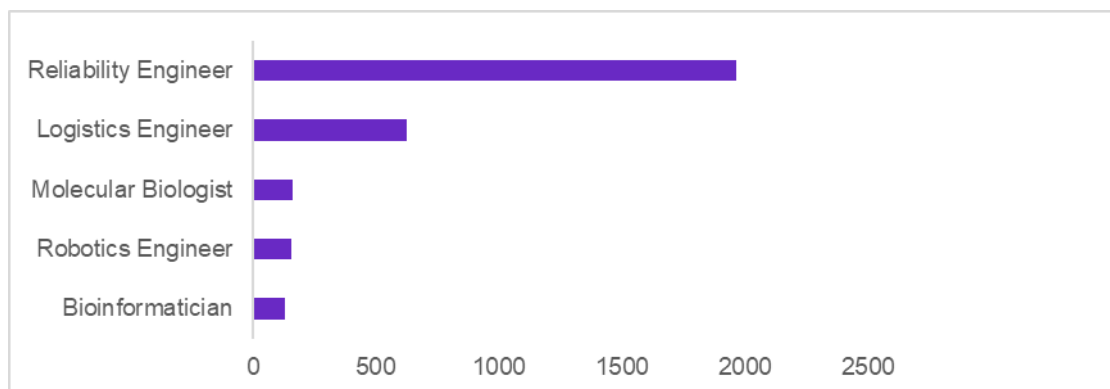
- Design and develop electrical systems for BESS, including battery sizing, selection, and integration into grid infrastructure.
- Collaborate with cross-functional teams to assess project requirements, develop technical specifications, and ensure compliance with industry standards and regulations.
- Perform detailed electrical analysis, simulation, and modelling to optimize BESS performance, efficiency, and reliability.
- Conduct feasibility studies and cost-benefit analysis to evaluate the economic viability of BESS projects and provide recommendations for optimization.
- Provide technical support during project execution, including coordination with contractors, vendors, and stakeholders.
- Stay current with emerging technologies, trends, and best practices in battery storage, renewable energy, and grid integration.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis.

## Science and engineering

Within the Science and Engineering theme five emerging roles were identified. Many of these roles involve duties and areas of expertise that have applications in a wide range of fields and therefore emerging roles identified in this theme could potentially be related to other themes such as Health, Care and Medical and Data and Technologies.

**Figure 8: Emerging roles in Science and Engineering by online job ad counts in 2022**



Source: Lightcast data 2022, Jobs and Skills Australia's analysis

Among the five roles, Reliability Engineer and Logistics Engineer had the highest number of online job ads with approximately 2,000 and 625 job postings in 2022, respectively.

Reliability Engineers generally oversee the risks and reliability associated with assets in business operations to improve equipment across its life cycle, while Logistics Engineers often deal with organisation-wide systems and networks. Both involve the application of specialist skills in large-scale industrial settings and projects such as design, testing, evaluation, production and operation.

Robotics Engineer was identified as an emerging role based on feedback from stakeholders to Jobs and Skills Australia's Survey of Employers who Recently Advertised (SERA).

Analysis of online job ads indicated the role has characteristics in common with a range of occupations including Mechanical Engineer, Software Engineer and Computer Network and Systems Engineer, indicating a blend of skills often found across these occupations.

Robotics Engineer listings are characterised by frequent reference to trending and emerging skills, like robotics and programming languages.

Robotic Engineers undertake a subset of work performed by Mechatronics Engineers with a narrower focus on designing and building autonomous or semi-autonomous robots. Although the number of online job listings for this role was substantially lower than other roles in the theme, demand appeared to increase over the five-year period (2018–2022).

Census of Population and Housing 2021 data showed 448 people reporting their occupation as a Robotics Engineer. Among these, only 9% were female. Similar to other emerging roles, the majority of the workforce in Robotics Engineer are those at their early or middle career, with 69% of people aged between 25 and 44 years old. The majority (83%) of the workforce reported working in a full-time capacity. Building on cutting edge skills and technologies, the role requires a high level of education attainment with 79% of the workforce holding a Bachelor degree or above. The weekly income distribution primarily ranged from medium to high, with 55% of workers earning between \$800 to just below \$2,000 and 35% had a weekly income of \$2,000 or above.

## Case study: Robotics Engineer

**Robotics Engineers research, design, build and deploy intelligent robots and robotic systems. They develop robots and systems that increase the efficiency, output and safety of a variety of tasks, often in a manufacturing or production setting.**

### Workforce profile (obtained from Census of Population and Housing 2021)

#### Workforce size



448 people

#### Female share



9% female

#### Working age

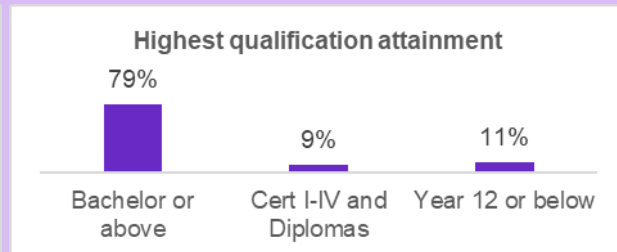
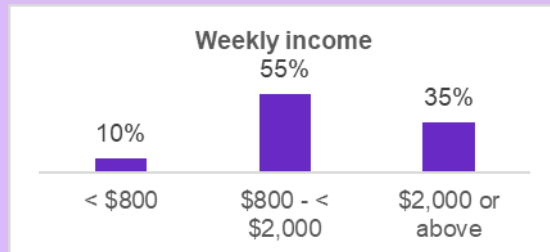


69% aged 25-44

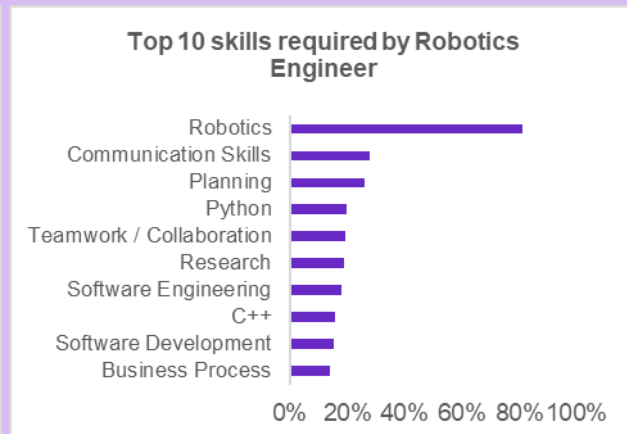
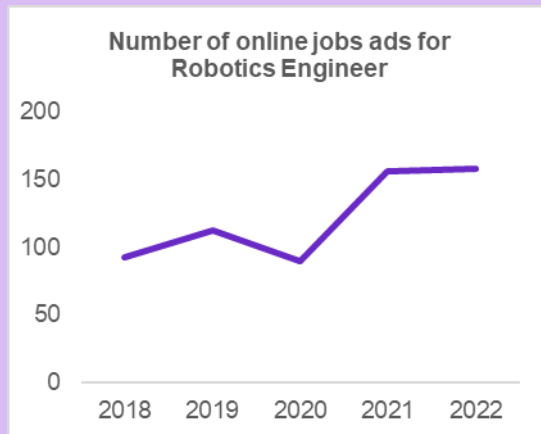
#### Full time/part time



83% worked FT



### Demand from online job ads



### Sample job ad text:

As our Robotics Deployment Engineer, you will lead and deliver successful implementations of mobile robot fleets on-site and overcome deployment challenges.

#### Requirements:

- 2+ years of direct experience deploying automated material handling equipment, automation, or robotics; experience deploying Automated Guided Vehicles, Autonomous Mobile Robots and Simultaneous Localisation and Mapping preferred.
- Understanding of industrial & logistics environments' workflows and the solution designs with automated equipment.
- Bachelor's or Master's degree in Robotics, Computer Science, or related field. Solid experience with Linux/Ubuntu and MySQL; experience with Robot Operating System and Computer Aided Design preferred. General knowledge of VPNs, firewalls, and routers; those with CCNA/CCNP certification preferred.
- Excellent presentation and communication skills; can connect with customers at all levels, Corporate-suite to factory floor. Good customer service instincts with a problem-solving mindset.
- Ability to multi-task and effective time management. The ability to see projects through from conception to completion.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis.

The emergence of the role Bioinformatician reflects a growing trend in the use of data analytics and data science in combination with genomics and clinical research.

Biotechnology typically involves laboratory-based experimentation, genetic engineering, and the practical application of biological organisms, cells, or molecules. Bioinformatics involves the development and use of computational tools to analyse and interpret large-scale biological data sets. Data from online job ads indicates a mixed skills set required for the role, including expertise in biology and genomics, data and computational skills as well as research and other soft skills.

Like Robotics Engineer, the number of online job listings for Bioinformatician was substantially lower than other roles in the theme but increased steadily over the five-year period (2018–2022). However, 211 workers reported their job to be Bioinformatician in the 2021 Census.

Compared with other emerging roles in the Science and Technology space, a significant share of the Bioinformatician workforce was female (36%). The role was characterised by people in their early or mid-career with 73% aged between 25 and 44 years. 81% of the workforce reported working in a full-time capacity. Bioinformatician is a highly skilled and highly paid role, 98% of the workforce had a Bachelor degree or above and 43% received at least \$2,000 per week. Only 2% of the workforce earned below the population median.

## Case study: Bioinformatician

*Bioinformaticians create, analyse and maintain large datasets of molecular and genomic information, and use computational methods and mathematical models for statistical analysis and carry out dynamic simulations and pattern analysis of biological data.*

### Workforce profile (obtained from Census of Population and Housing 2021)

#### Workforce size



211 people

#### Female share



36% female

#### Working age

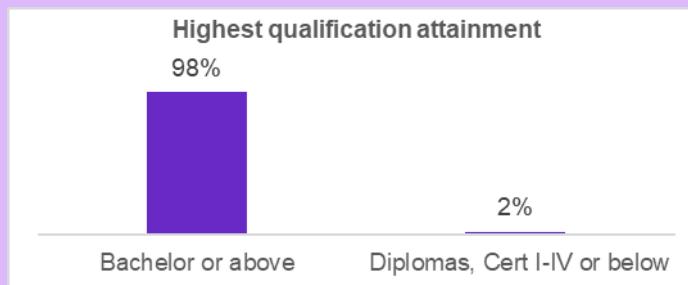
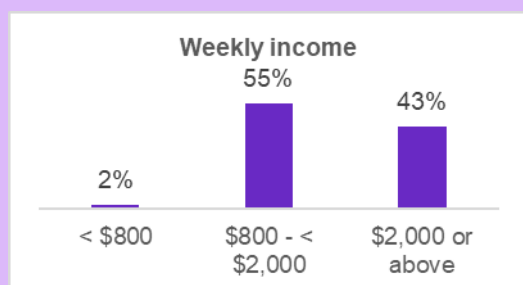


73% aged 25-44

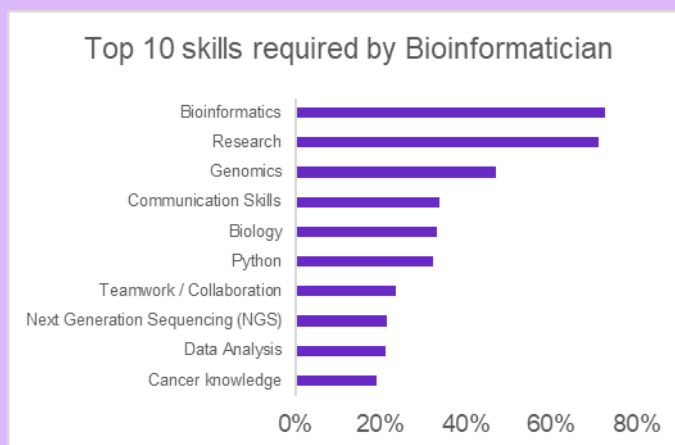
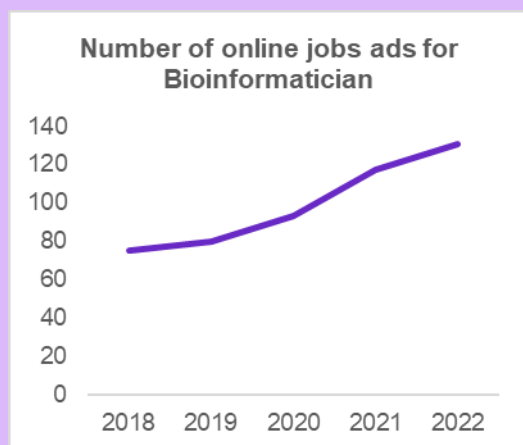
#### Full time/part time



81% worked FT



### Demand from online job ads



### Sample job ad text:

The role offers a dynamic opportunity for a skilled bioinformatician to immerse themselves in the evolving landscape of life science research. In addition to contributing to high-impact research projects and collaborating with experts across various disciplines, the role involves a significant emphasis on teaching, training, and capacity-building within the bioinformatics field.

Your responsibilities will include:

- Subject Coordination and teaching towards the Master of Science (Bioinformatics) course.
- Develop and deliver materials and resources for training and education in bioinformatics.
- Supervise/mentor higher degree students, encouraging and facilitating student engagement in both discipline-specific and broader professional networks.
- Consultation – providing advice to life scientists about best-practice workflows and methods of implementation across diverse projects. This will vary in form, including contexts such as at the research-group level, individual researcher -level and input to research funding applications.

Source: Lightcast data 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis.

# Artificial Intelligence

## AI skills in the labour market

Artificial Intelligence (AI) is predicted to transform the way we work. Recent research on AI, for example the OECD's 'Emerging trends in AI skill demand'<sup>10</sup>, the Future Skills Organisation's 2023 report 'Impact of generative AI on skills in the workplace'<sup>11</sup>, LinkedIn's Future of Work and Workplace Learning reports in 2023<sup>12</sup> and 2024<sup>13</sup>, and Deloitte's report on AI in 2023<sup>14</sup>, have discussed the importance of AI skills, their rate of adoption and predicted long term impact on the labour market.

While new applications for AI are emerging every day, and it has the potential to revolutionise industries, streamline tasks and create new opportunities; evidence from current Australian internet job advertisement data suggests the take up of AI to date is modest and concentrated in particular industries and occupations<sup>15</sup>.

Jobs and Skills Australia's analysis indicates that the proportion of online job ads listing AI skills increased between 2018 and 2020 but declined in more recent years. AI skills were more prominent among technical occupations related to data and technologies than to general roles such as Advertising and Marketing Professionals and Accountants, indicating a slower uptake of AI, at least in terms of the defining job characteristics employers list in job ads.

This section explores AI roles and skills in demand across the Australian labour market based on in-depth analyses using more than 7.5 million online job ads from Lightcast between 2018 and 2023. It gives some examples of how AI skills are being incorporated into existing occupations and leading to the development of new emerging roles.

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<sup>10</sup> Borgonovi, F., Calvino, F., Criscuolo, C., Samek, L., Seitz, H., Nania, J., Nitschke, J and O'Kane, L. (2023), 'Emerging trends in AI skill demand across 14 OECD countries', OECD Artificial Intelligence Papers, No. 2, OECD Publishing, Paris.

<sup>11</sup> Future Skills Organisation's Impact of generative AI on skills in the workplace (<https://www.futureskillsorganisation.com.au/impact-of-generative-ai-on-skills-in-the-workplace>)

<sup>12</sup> Future of Work report - AI at work (<future-of-work-report-ai-november-2023.pdf>)

<sup>13</sup> Workplace Learning Report (<LinkedIn-Workplace-Learning-Report-2024.pdf>)

<sup>14</sup> The Generative AI Dossier ([Deloitte\\_us-ai-institute-gen-ai-use-cases.pdf](Deloitte_us-ai-institute-gen-ai-use-cases.pdf))

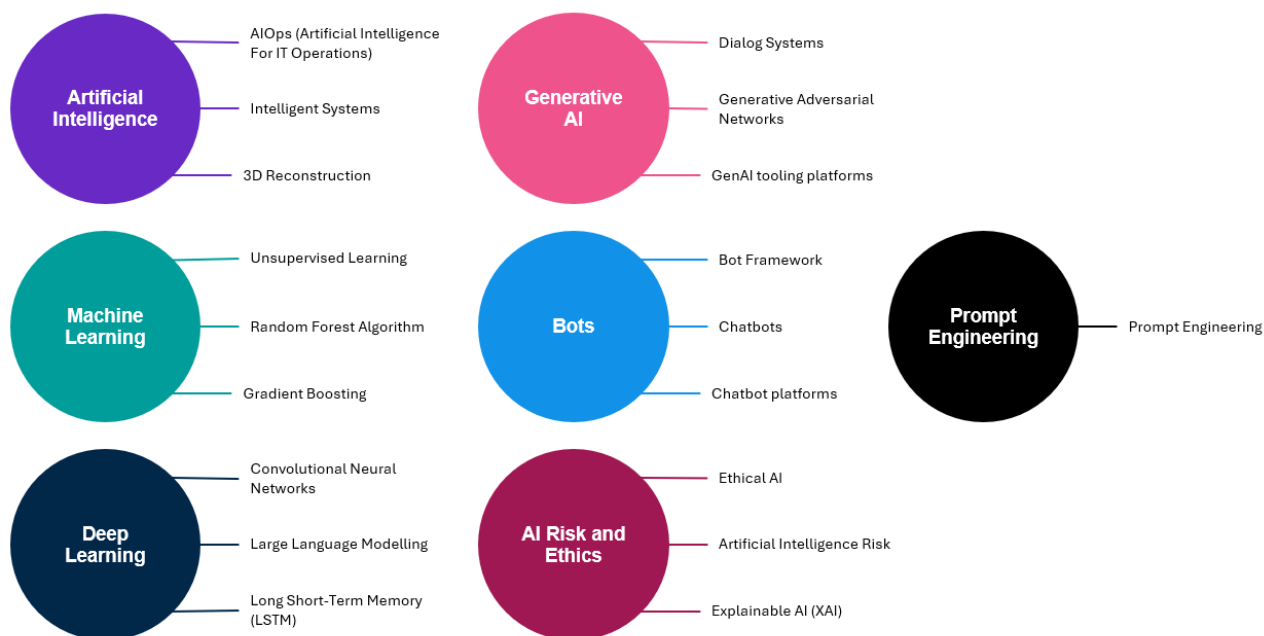
<sup>15</sup> This section used occupations and industries described in the ABS 2022 ANZSCO and 2013 ANZSIC classification.



## Identifying AI skills

The Lightcast skills taxonomy includes 150 specific skills related to AI and machine learning. Jobs and Skills Australia grouped these into 7 clusters. Figure 9 provides examples of skills in each cluster<sup>16</sup>.

Figure 9: AI Skills Clusters and examples of skills



Source: Lightcast skills taxonomy, Jobs and Skills Australia groupings

Each cluster consists of similar skills relating to a common field or topic. For instance, the Machine Learning skill cluster covers different techniques such as supervised and unsupervised learning, model training and monitoring, boosting, support vector machine and random forest algorithms. It also includes machine learning procedures, such as Machine Learning Operations (MLOps), and libraries such as scikit-learn or Microsoft Cognitive Toolkit (CNTK).

The Artificial Intelligence cluster covers skills and techniques used broadly across the AI field, such as image and voice recognition, intelligent control, Artificial Intelligence for IT Operations (AIOps) and 3D Reconstruction.

Prompt Engineering is the process of optimising instructions for Large Language Models to produce relevant output. As it is quite different to the skills required to design, develop or manage AI models, it was not clustered with other skills.

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<sup>16</sup> This grouping of skills differs from Borgonovi et al. (2023), which used different selection of skills from Lightcast data.

## Demand for AI skills over time

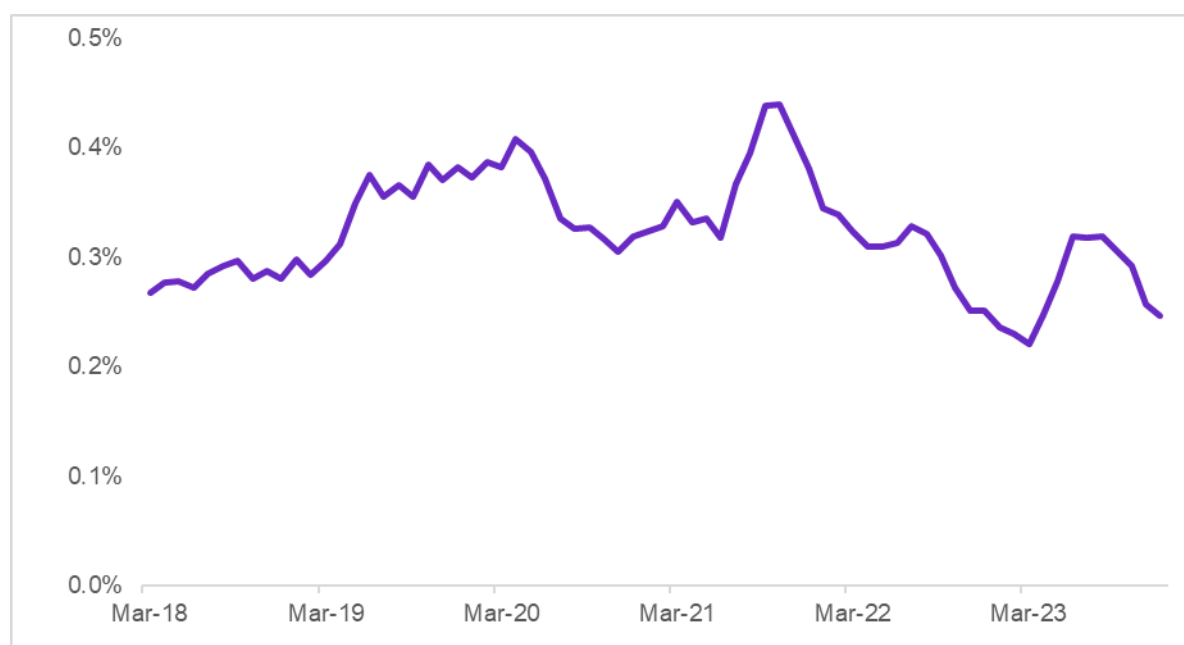
In this section, we extend the data period to the most recent year (2023) to explore the trend for AI skills in demand in the Australian job market.

Figure 10 shows the demand for AI skills, which was measured as the proportion of online job ads listing AI skills compared to the total number of job ads, on a monthly basis over the period between 2018 and 2023.

Generally, the demand for AI skills for the Australian job market remained low throughout the period, with about 0.3% of job ads listing AI skills.

In the Australian job market, there was an increasing trend in demand for AI skills between 2018 and early 2020 with the share of job ads listing AI skills increasing from around 0.3% in early 2018 to 0.4% in early 2020. This dipped back to 0.3% in the final quarter of 2020 and peaked again at 0.4% at the end of 2021, followed by a downward trend to about 0.2% by December 2023<sup>17</sup>.

**Figure 10: Proportion of job ads requiring AI skills between 2018 – 2023, monthly data with 3 month moving average**



Source: Lightcast data 2018 - 2023, Jobs and Skills Australia's analysis

Some of the decline in the percentage of job ads listing AI skills between 2021 and 2023 may be related to post-COVID labor market adjustments, or a shift in the kinds of jobs advertised online and captured in the Lightcast data set. In 2021, 37% of job ads were for low skilled occupations<sup>18</sup> (which are less likely to feature AI skills), in 2023, this rose to 42%.

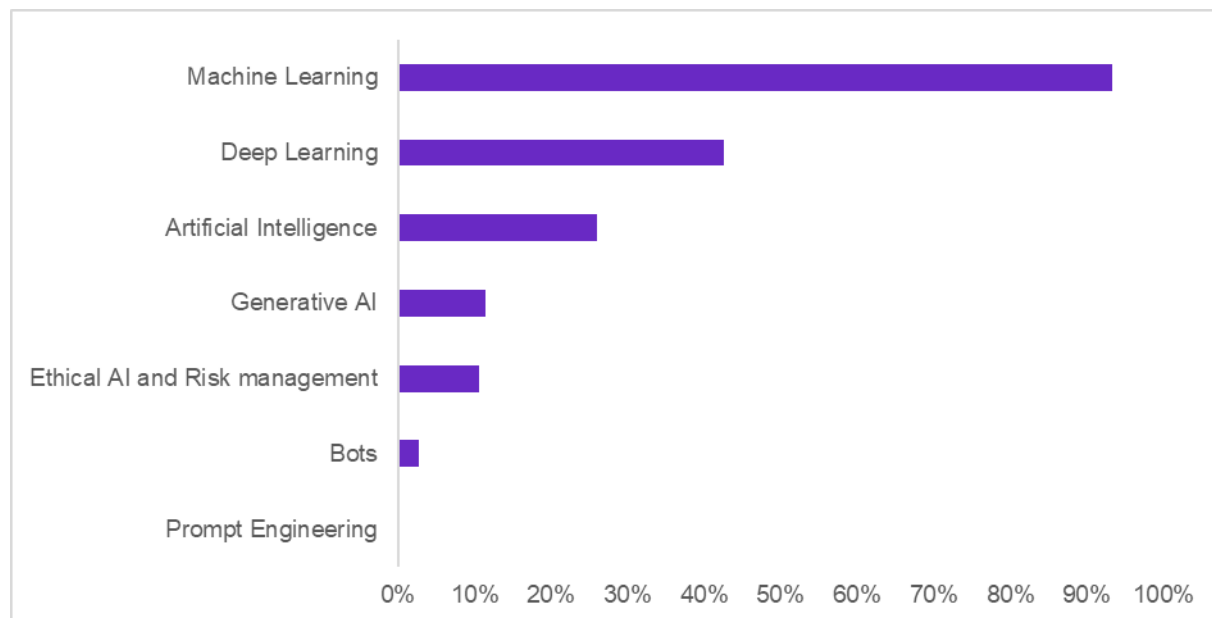
<sup>17</sup> The numbers fall within the range reported by Borgonovi et al. (2023).

<sup>18</sup> Low skill occupations are those with skill level 4 and 5 according to the ABS ANZSCO skill levels definition.

## Demand for AI skills by category

Of the 7.6 million online job ads in our sample, just over 24,000 listed AI skills. Figure 11 shows the percentage of job ads listing skills in each of our seven categories between 2018 and 2023.

Figure 11: Job ads listing skills between 2018 and 2023 by category



Source: Lightcast data 2018 - 2023, Jobs and Skills Australia's analysis

The majority of job ads requiring AI skills were specifically seeking candidates with expertise in Machine Learning, accounting for 93% of the total AI skills-related job market. The high demand for skills related to Machine Learning is also observed in other countries<sup>19</sup>.

The second most common cluster was Deep Learning, which includes skills related to neural networks and large language modeling, accounting for 43% of all AI listings. The Artificial Intelligence cluster, covering high level or generic descriptions of skills and techniques used widely in AI, accounted for 26% of AI related job ads.

Ethical AI and Risk Management appeared in 11% of ads listing AI skills. This highlights the importance of ensuring AI technologies are developed and used responsibly. Promoting ethical practices can help to mitigate potential risks associated with AI.

While AI skills such as Machine Learning, Deep Learning and Generative AI can overlap, this analysis categorises them distinctly. It's important to note that job postings list various AI skills that could fall under multiple categories.

<sup>19</sup> Borgonovi et al. (2023)

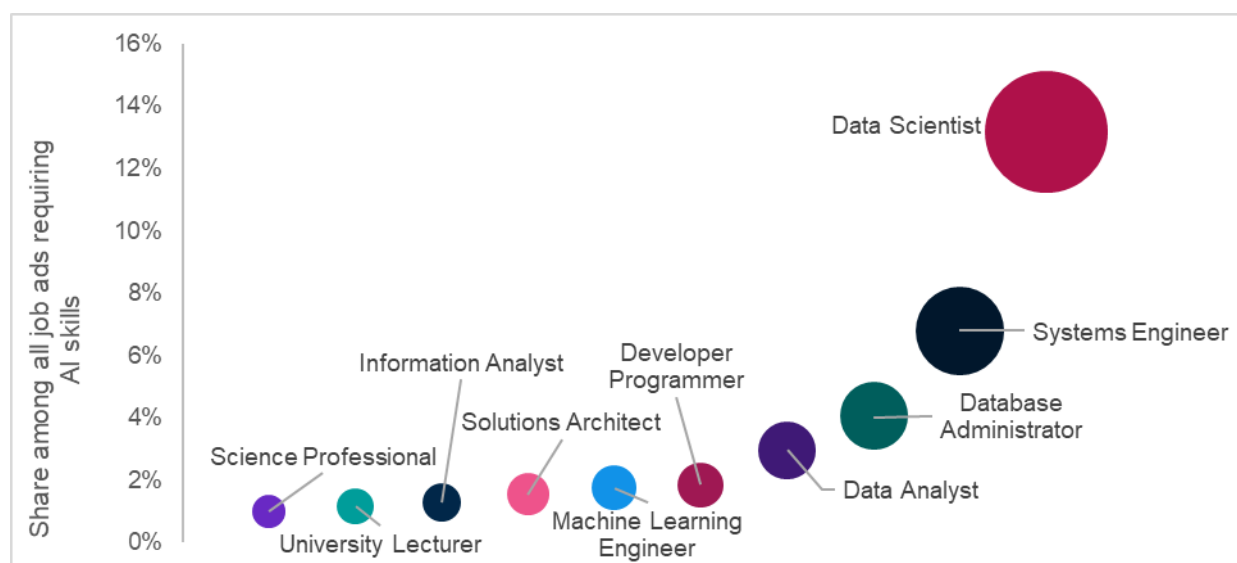
## Demand for AI skills across roles

Similar to other OECD countries<sup>20</sup>, roles requiring AI skills in Australia were predominantly found in ICT, Data, and Professional Services. The most common roles with internet job ads listing AI skills were Data Scientist and Systems Engineer, with 13% and 7% of all AI related job ads, respectively.

As shown in Figure 12, other roles such as Science Professionals and University Lecturer (both around 1%) made-up smaller shares of AI related job ads.

These results show the top 10 roles with the largest share of AI skills remain concentrated in IT and technical fields. It should be noted that beyond the top 10 roles, AI skills were also reported in non-ICT or data related roles (e.g., Project Officer and Sales Representative), albeit smaller shares of the total AI related job ads.

Figure 12: Top 10 AI skills-related job titles



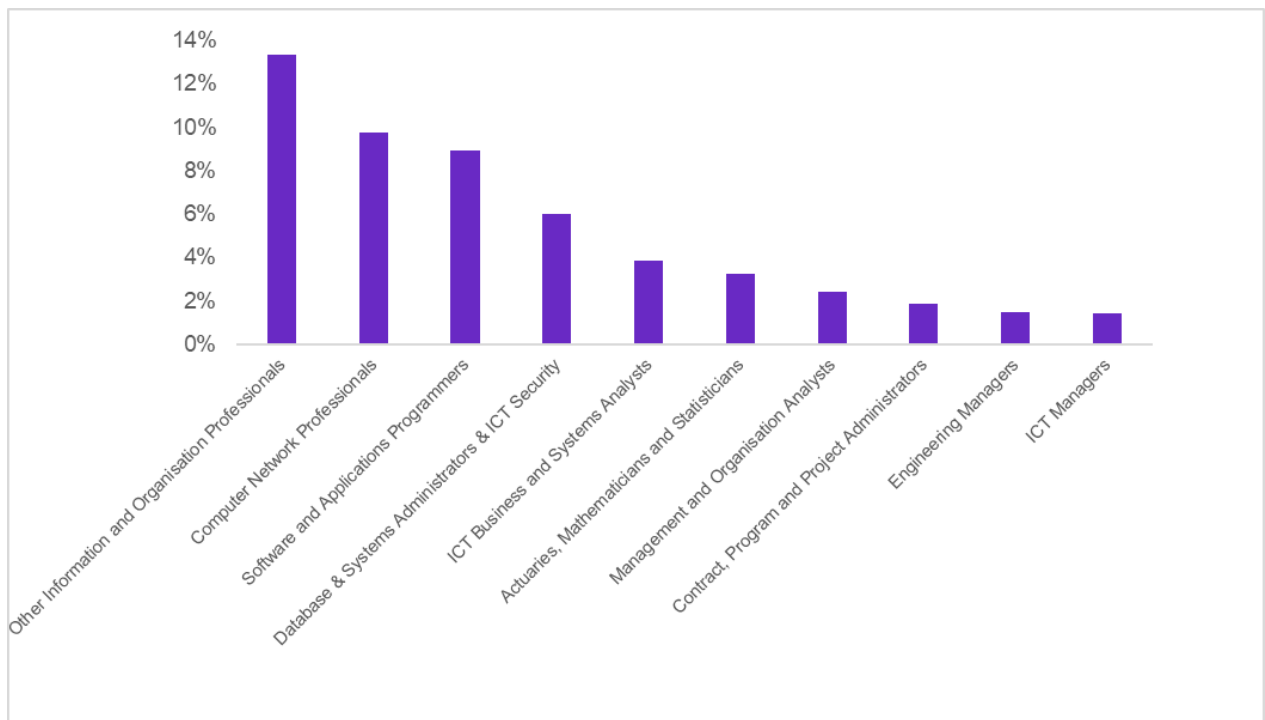
Source: Lightcast data 2018 - 2023, Jobs and Skills Australia's analysis

<sup>20</sup> Borgonovi et al. (2023)

Roles can be grouped together into occupations to provide a more aggregated analysis of the labour market. Figure 13 shows the top 10 occupations with the highest demand for AI skills.<sup>21</sup>

Of approximately 24,000 job ads mentioning AI skills, 13% were for Other Information and Organisation Professionals, 10% for Computer Network Professionals, 9% for Software and Applications Programmers, 6% were for Database and Systems Administrators and ICT Security, 4% for ICT Business and Systems Analysts and 3% for Actuaries, Mathematicians and Statisticians<sup>22</sup>.

**Figure 13: Top 10 occupations with highest demand for AI skills**



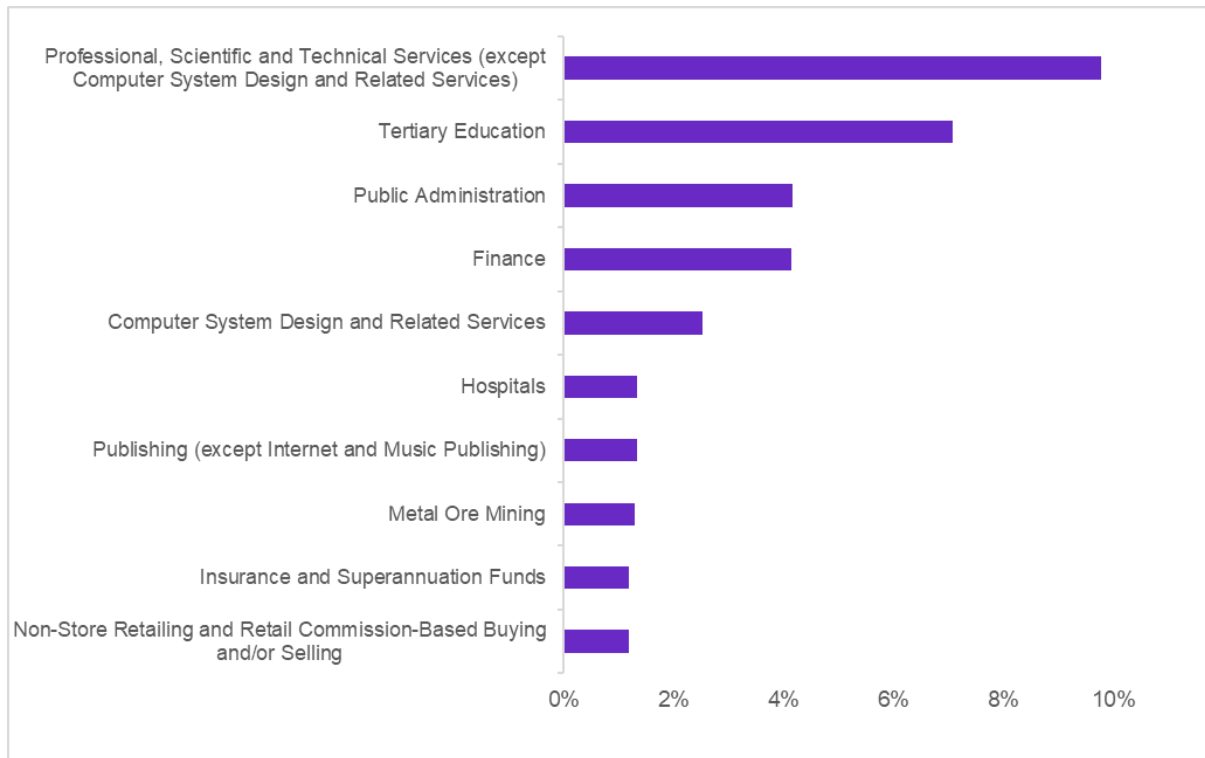
Source: Lightcast data 2018 - 2023, Jobs and Skills Australia's analysis

<sup>21</sup> The percentage share of job ads in Figures 13 and 14 is not a measure of AI skills intensity for a particular occupation or industry.

<sup>22</sup> This section used occupations and industries described in the ABS 2022 ANZSCO and 2013 ANZSIC classification.

The occupation data in Figure 13, coupled with the industry data in Figure 14 below, indicate AI skills are spread across a range of roles and applied in a range of contexts. The top five industries with job ads listing AI skills included Professional, Scientific and Technical Services, Tertiary Education, Public Administration, Finance and Computer System Design and Related Services.

**Figure 14: Top 10 industries with highest demand for AI skills**



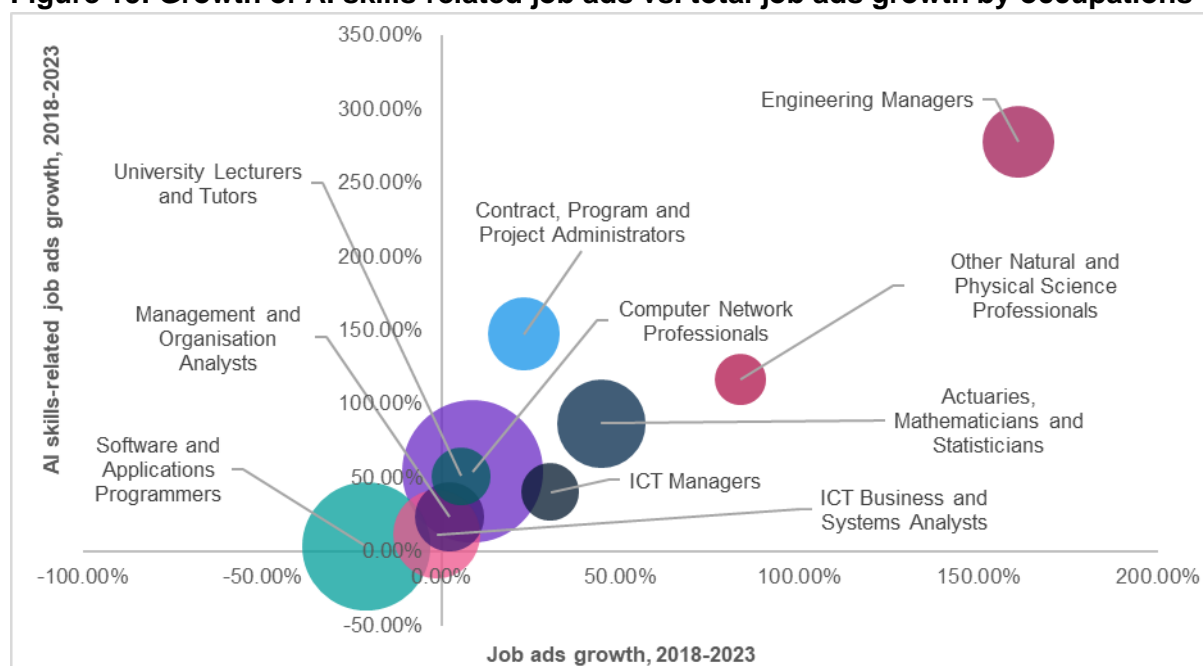
Source: Lightcast data 2018 - 2023, Jobs and Skills Australia's analysis

## AI Niches and Emerging Roles

Although overall demand for AI skills has fluctuated over the last 5 years and declined recently, demand for AI skills within some occupations has increased. In 2018, 0.2% of job ads for Geologists and Geophysicists included AI skills, by 2023, this had increased to 0.6%. For Engineering Managers, ads listing AI skills increased from 0.8% to 1.1%. For both occupations, AI skills were focused on machine learning.

Another way of looking at the increasing proportion of job listings that included AI skills is to compare the growth of job ads requiring AI skills to the growth of all job ads in the same occupation. Across the labour market, 35% of occupations experienced a larger growth in AI skills related job ads compared to overall job ads growth.

**Figure 15: Growth of AI skills-related job ads vs. total job ads growth by occupations**



Source: Lightcast data 2018 - 2023, Jobs and Skills Australia's analysis

Figure 15 highlights 10 occupations where the growth in job ads that listed AI skills was larger than the growth in ads for the occupation overall. The horizontal axis shows the total job ads growth for an occupation between 2018 and 2023, while the vertical axis shows the growth in the number of job ads requiring AI skills in that occupation. The size of the bubbles represents the share of AI skills-related job ads in the occupation as a proportion of job ads that included AI skills across all occupations in 2023.

Towards the bottom left of Figure 15 are two IT occupations characterised by a large share of the AI skills across the labour market and relatively slow growth in AI related job ads. In other words, for these occupations, AI seems to be closer to 'business as usual'. These included Software and Applications Programmers (where all listings shrank by 20.9% but AI listings grew by 3.5% and the occupation represented 10.1% of all job listings that included AI skills) and Computer Network Professionals (all listings grew by 8.7%, AI listings grew by 54.5%, accounting for 12.1% of all AI job listings).

In contrast, two management occupations had a smaller share of the AI skills across the labour market, but larger growth in AI related job ads. For these occupations, AI skills seem to represent a new and growing opportunity. These included Contract and Program Administrators (where all listings grew by 23.0%, but AI listings grew by 147.6% and the occupation represented 3.18% of all job listings that included AI skills) and Engineering Managers (all listings grew by 161.0%, AI listings grew by 277.8% and the occupation represented 3.12% of all job listings that included AI skills).

There are other occupations, such as Sales Representatives, where AI skills seem to be more specialised and might represent niche opportunities for candidates that can blend AI skills with other expertise. These may be a lead indicator for future emerging roles. For example, if the share of AI skills in Sales Representative roles continues to grow, we may see evidence of emerging roles like 'AI aided sales representative' or 'sales intelligence refiner', as the sample job ad text below indicates.

**Sample job ad text: AI Sales Representative**

We're looking for a dynamic Sales Representative to work alongside business development AI intelligence to ensure we are sending the right messages to the right customers at the right time. You will partner with AI to maintain a human-in-the-loop strategy, ensuring effective customer messaging.

*Source: Lightcast*



## Emerging Role: AI Engineer

AI Engineers build software that can perform various tasks without human involvement. AI Engineers are also responsible for developing, programming and training complex networks of algorithms that function like a human brain.<sup>23</sup>

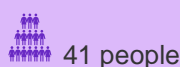
Starting from a very low base, online job ads for AI Engineers increased significantly (about 300%) between 2018 and 2022. However, the number of job ads remained low at 105 job listings. Similarly, data from the Census of Population and Housing 2021 also recorded a small number of Australians who reported working as AI Engineers (41 people).

### Case study: AI Engineer

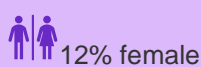
**Artificial intelligence (AI) Engineers are responsible for developing tools, systems, and processes to enable the application of artificial intelligence in real-world contexts.**

#### Workforce profile (obtained from Census of Population and Housing 2021)

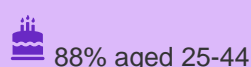
##### Workforce size



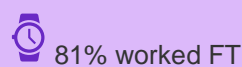
##### Female share



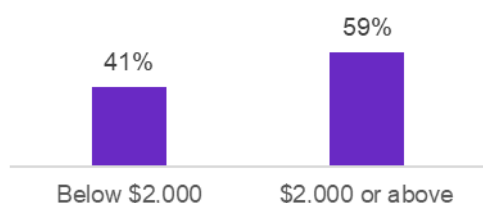
##### Working age



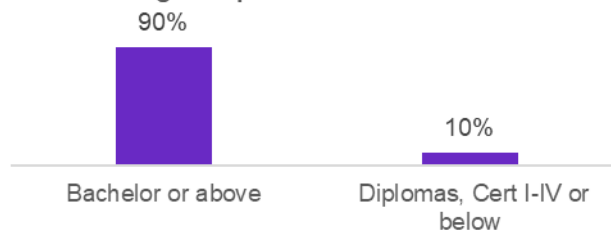
##### Full time/part time



#### Weekly income

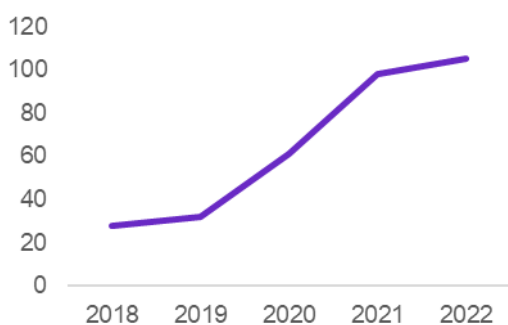


#### Highest qualification attainment

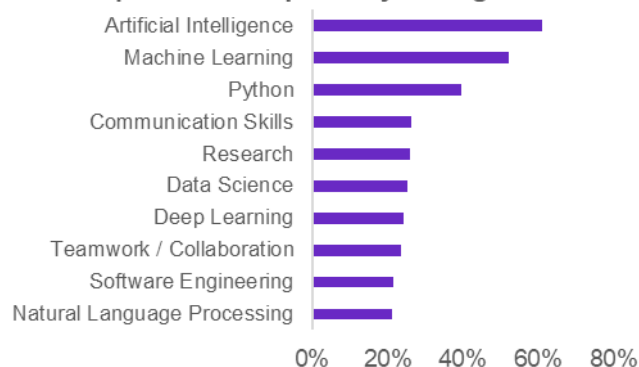


### Demand from online job ads

#### Number of online jobs ads for AI Engineer



#### Top 10 skills required by AI Engineer



#### Sample job ad text:

We are seeking an Artificial Intelligence Engineer to join our qualified team. We are looking for expertise in building Retrieval-Augmented Generation (RAG) factories using any large language models, and integrate the RAG components (retrieval models, generation models, ranking models) into a functional pipeline for efficient information retrieval and generation. You will build Gen AI-based applications on cloud platforms.

Source: Lightcast data 2018 – 2022 and Census of Population and Housing 2021, Jobs and Skills Australia's analysis

<sup>23</sup> [Training for AI engineers | Microsoft Learn](#)

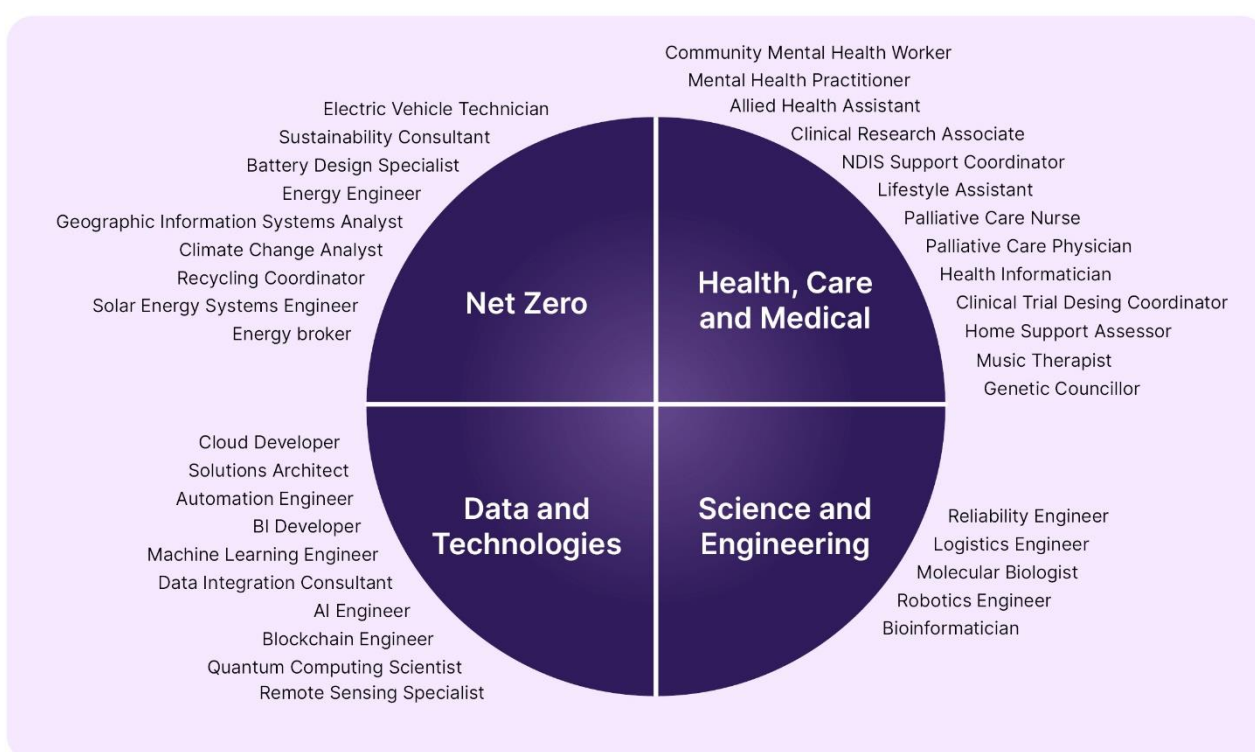
# Conclusion

Emerging roles are those that have appeared in the Australian labour market for the first time in recent years or are growing quickly from a small base. They are roles that are becoming more prominent or represent a distinct specialisation or new field of work.

This report has identified 37 emerging roles across 4 key themes: Net Zero, Health, Care and Medical, Data and Technologies (including AI) and Science and Engineering.

This process began with an environmental scan to identify evidence of increased market demand over the last five years, using lead indicators like intellectual property, research grants and international classifications. Specific roles were then identified in online job ads and validated against Census of Population and Housing 2021 micro-data.

**Figure 16: Emerging Roles**



Emerging roles aid our understanding of evolving skill needs in the labour market and the changing landscape of Australian jobs. By continuously monitoring these shifts and offering detailed skills analysis, Jobs and Skills Australia hopes to assist in shaping our education and training systems to meet demand for specific skills and support Australia’s adaptation to economic and technological change.

# Acknowledgements

Jobs and Skills Australia acknowledges the traditional owners of Country throughout Australia on which we gather, live, work and stand. We acknowledge all traditional custodians, their Elders past and present, and we pay our respects to their continuing connection to their culture, community, land, sea and water.

Jobs and Skills Australia would also like to thank all stakeholders who generously contributed their time, expertise, and feedback to this report. Special thanks to the Australian Bureau of Statistics who provided valuable data and insights that significantly enriched the content of this report and facilitated access to invaluable data.

# Appendix A – Data Sources

Data Source	Description
IP Government Open Data (IPGOD)	IPGOD provides access to over 100 years of information on IP rights applications. The data covers four types of IP rights: trademarks, patents, design rights and plant breeder's rights. The patent data file consists of more than one million records each year.
Australian Research Council Grants (ARC)	The ARC Grants Dataset is a public dataset that contains all research projects funded by the ARC since 2002. The data is provided at the project level with detailed information including Field of Research (FoR), funding allocation, administering organisation, the number of applications received, projects funded and the success rate by scheme, and Primary Field of Research Group.
The Occupational Information Network (O*NET)	O*NET is the United States Bureau of Labour Statistics' Occupational Information Network database, which contains information on all United States occupations through annual surveys of United States workers since 2000.
European Skills, Competences, Qualifications and Occupations (ESCO)	ESCO is the European multilingual classification of Skills, Competences and Occupations. It has one of the largest occupation taxonomies with over 3000 occupations, mapped to the International Standard Classification of Occupations (ISCO).
Training.gov.au TGA (2023 data)	TGA is time series data on new/superseded (equivalent, non-equivalent) on qualifications, training packages, units of competency, skill sets for vocational education and training (VET).
Lightcast Australian postings data (2018-2023)	Lightcast is online job advertisement which produces its dataset by scraping online job postings to extract, parse and aggregate information about a large and diverse range of jobs and industries.
Census of Population and Housing 2021	The Census of Population and Housing is conducted every five years to measure the number of people in Australia on Census night, their key characteristics and the households and dwellings in which they live.
Australian and New Zealand Standard Classification of Occupations (ANZSCO)	ANZSCO is primarily a statistical classification designed to aggregate and organise data collected about jobs or individuals. The classification definitions are based on the skill level and specialisation usually necessary to perform the tasks of the specific occupation, or of most occupations in the group.