Geographic Information Systems Careers

What are Geographic Information Systems (GIS)?

A Geographic Information System (GIS) is a computer system used to compile and display environmental and other data cartographically (on a map). It is an interactive system which allows users to compare and analyse chosen factors spatially, which helps the patterns and relationships between factors to be better understood. For example, environmental data such as topography can be presented alongside socioeconomic data such as population to enable very specific visual comparisons to be made. Referencing a variety of data sets to a fixed location on earth enables a bespoke visual representation of data every time, and for any purpose.

Modern organisational systems produce and store a lot of data. Environmental informatics is a system that allows collection, storage, analysis and processing of environmental data - with the aim of enabling it to be applied to environmental issues.

Specialisation in GIS and environmental informatics equips students with technological skills underpinned by sound knowledge of environmental and social systems. Graduates can apply these skills to help address complex environmental problems facing communities and the world today. From building efficient transport network systems, forecasting flood zones, or finding out how a new development project will be affected by shade, GIS and environmental informatics are at the forefront.

GIS in New Zealand and the world

New Zealand industries are increasingly using technology to enable them to perform more efficiently, and to increase capabilities. Alongside this, there is more demand now for evidence-based decision-making across all organisational levels. As a consequence of both these factors, more and more information – data – is generated, and it is being called on for use in planning and decision-making. Professionals are needed who can capture, manage and analyse datasets, and use data effectively to make predictions and plan for the future.

GIS and environmental informatics harness technological advancements and use them to map out and make plans for practically anywhere on earth. From professionals working in large and small urban areas, to rural industries such as forestry or agriculture, or in ocean and offshore regions, demand is growing for specialists in these fields. Graduates who manage their career to develop a specialisation can find themselves highly sought after. Until they reach that point in their career, graduates who gather experience in one, or a variety of roles, will see themselves well placed to find their niche in this exciting and fast-paced area.

Skills and knowledge developed by studying GIS

Lincoln University graduates develop a set of skills and knowledge over the course of their degree that readies them to enter the workforce as a competent graduate-level professional. By the time they graduate, students of GIS and environmental informatics are able to manage, manipulate and analyse data in a variety of software environments, operate and apply appropriate software, and develop software applications. As part of the degree, in addition to computing courses, the broader theories of social science are studied, as well as government and policy, giving graduates sound interdisciplinary perspectives on a variety of land-based issues.

Employers seek well-rounded, engaged graduates with a strong work ethic. As in any sector, employers value those with a professional attitude. This includes good communication (including the ability to communicate to groups, as well as effective interpersonal and written communication), honesty, self-motivation, initiative, time management, and flexibility. The importance of these basic skills cannot be underestimated, even in voluntary or internship roles, as future job opportunities often arise from a good reputation and a varied network of contacts.

Skills and knowledge valued in GIS roles:

Knowledge of data collection, storage and analysis methods

Ability to read plans, maps and survey sheets

Ability to manage and manipulate data over a variety of software environments

Familiarity with ESRI suite of GIS products including ArcGIS Desktop, Model Builder and extensions

'Big-picture' thinking

Ability to manage client relationships

Ability to develop software applications

Knowledge of data repository design

People and communication skills

Professional attitude and manner

Analytical thinking skills

Innovative and logical approach

High attention to detail

Solution-focussed attitude

Knowledge of biophysical sciences that underpin environmental management issues

Modelling and cartographic design skills

Where can GIS graduates find work?

Places of employment for GIS and environmental informatics graduates include:

- Multi-national, national, or local consultancies (e.g., Critchlow Ltd., Aurecon, Opus International, North South GIS NZ Ltd.)
- Government bodies/ departments (e.g. NZ Petroleum and Minerals (NZPAM), Ministry of Business, Innovation and Employment (MBIE), Land Information New Zealand (LINZ))
- Local/ regional government (e.g., Christchurch City Council, Auckland Council, Bay of Plenty Regional Council)
- New Zealand Defence Forces (NZ Air Force, Army, Navy)
- Electricity or transport network organisations (e.g., Transpower NZ, Northpower Ltd., Auckland Transport)
- Crown Research Institutes (e.g., NIWA, SCION, Landcare Research, AgResearch, GNS Science, Plant and Food Research)
- Tech companies (e.g., Trimble Navigation, Eagle Technology Group, Geospatial Intelligence Organisation, Synergy Positioning Systems Ltd.)
- Mineral resources industries, such as oil, gas or mining (e.g., Solid Energy, NZ Oil and Gas, OceanaGold)
- Academic Lecturer/ Professor

GIS job titles

Air Quality/ Pollution Technician

ArcGIS Developer

Data Collection Analyst (Field Data Capture)

Defence Force Geospatial Technician

Electronics Support Technician – Global Navigation Satellite Systems

Environmental Planner

Geospatial Analyst- Terrain

Geospatial Consultant

Geospatial Data Administrator

Geospatial Developer

Geospatial Engineer

GIS Administrator

GIS Assistant

GIS Consultant/ Manager/ Analyst

GIS Developer

Technical Analyst

GIS Technician

Hydrographic Systems Operator (Surveyor)

IT/GIS Support Person

Navigational Chart Developer

Network Information Analyst

Research and Development Officer

Research Engineer

Solution Architect- GIS

Spatial Information Officer

Surveyor/ Surveying Assistant

Transport Planner/ Engineer

Urban Data Officer

Pay rate indications: full time equivalent (FTE) $NZ per annum

Most starting salaries for graduates of bachelor degrees fall between 40,000 - 55,000. Entry level jobs are stepping stones to roles with increased responsibilities and remuneration. Your employability is enhanced by all of your life experiences, be they employment related, or the transferrable skills and competencies gained from community involvement, volunteer work, or previous work or study- all of which can grow competency, expand networks, and demonstrate enthusiasm to future employers.

Some roles offer performance based annual incentives, or other remuneration supplements.

Job title	Indicative pay
Graduate GIS Technician/ Consultant	From 45,000
Junior GIS Developer	45,000 – 50,000
Air Force Intelligence Officer- Cadet	From 34,572
Air Force - Squadron Leader	101,983 – 152,578
Geospatial Data Administrator	49,000 – 60,000
Geospatial Internship	From 38,000
GIS Intern/ Assistant	48,000 – 57,000
GIS/ Geospatial Developer (early career)	60,000 – 80,000+
GIS/ Geospatial Developer (late career)	80,000 – 110,000+
GIS/ Geospatial Analyst (early career)	40,000 – 65,000
GIS/ Geospatial Analyst (mid-late career)	70,000 – 100,000+
Academic Lecturer/ Professor	74,000 – 120,000+
Senior GIS Consultant	90,000 – 120,000+
Transport Planner	From 50,000
Transport Engineer	70,000 - 150,000

GIS tasks

The following list includes the types of tasks that GIS graduates might undertake in a geospatial data administration role.

Locating, evaluating and integrating data from a wide range of sources

Data-modelling

Design and maintenance of geodatabase

Producing bespoke maps to cater to the needs of specific audiences

Packaging geospatial data in accessible and visually appealing ways

Aeronautical and hydrographic charting

Web-mapping

Liaising with stakeholders and colleagues

Collating and administering geospatial and imagery datasets

Presenting to groups in meetings, or via written reporting

Making decisions based on environmental and other evidence

Job tasks are role-specific, so the above is an indication only. For more information on roles, registered Lincoln University students can search Lincoln CareerHub (including expired jobs) for job titles similar to those they are interested in. Job descriptions, including tasks and skills required, are often available.

Graduate profiles

**Matt Couldrey
Bachelor of Science, Environmental Biogeoscience major**
Scientific Officer- Geospatial Specialist, Environment Southland

**Ewan Dickie
Bachelor of Software and Information Technology**
GIS Consultant, Eagle Technology

Industry bodies

Membership of an industry specific body enhances the professional status of students and employees. By joining a professional body, members can research career options, access training and events, and network and collaborate with industry colleagues at all levels.

Examples of GIS and Environmental Informatics industry bodies include:

Environment Institute of Australia and New Zealand (EIANZ)
www.eianz.org

NZ Petroleum and Minerals
www.nzpam.govt.nz

Land Information New Zealand
www.linz.govt.nz

The Australia New Zealand Land Information Council (ANZLIC)
www.anzlic.gov.au

Open Geospatial Consortium
www.opengeospatial.org
Surveying and Spatial Sciences Institute (Australia)
www.sssi.org.au
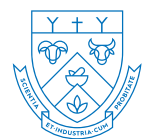
International Society for Digital Earth
www.digitalearth-isde.org

International Cartographic Association
www.icaci.org

Geospatial Information and Technology Association (GITA)
www.gita.org

**Michelle Ash
Careers and Employment**
Library, Teaching and Learning
E: michelle.ash@lincoln.ac.nz
P: +64 3 423 0331

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TE WHARE WĀNAKA O AORAKI