CSIRO Chile Centre of Excellence

Delivering world-class applied research in mining and mineral processing
The CSIRO Chile International Centre of Excellence will benefit both Australia and Chile by supporting greater linkages between the vital mining equipment, technology and services sectors.
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To increase the productivity and longevity of the global mining and minerals sector we must develop new cutting edge technologies and push for vast improvements in current services and equipment. To achieve these ambitious goals, research organisations and industry bodies from around the world must work together in collaboration.

Chile and Australia have worked together in the minerals sector for over 15 years. We face many similar challenges, including processing lower grade ores, deeper mining, arid environments, water constraints and increasing energy costs. These shared challenges make us natural partners in this area, which is why we have formed the CSIRO Chile International Centre of Excellence in Mining and Mineral Processing.

The Centre will provide Chile and Australia with an opportunity to collaborate to create solutions for our current and future challenges, and to secure the long-term viability of our minerals industries.
The CSIRO Chile International Centre of Excellence will benefit both Australia and Chile by supporting greater linkages between the vital mining equipment, technology and services sectors. It will invest in the development of human capital through the creation of new skilled jobs and postgraduate training opportunities.

This partnership between CSIRO, the University of Chile, the University of Antofagasta, CICITEM and our industry partners will cultivate deep relationships and will contribute to ensuring the competitiveness of Australia and Chile’s resource base.

I am extremely excited about the development of the new centre and anticipate that together we will build a world-leading partnership that will benefit the minerals industries of both countries for years to come.

Dr Orlando Jiménez

Executive Director, CSIRO Chile Centre of Excellence
Collaborating with Excellence

Chile’s Attraction of International Centres of Excellence program was created to facilitate the establishment of world-class research and development centres that will address the nation’s key priorities, such as aquaculture, global services, food industry and mining.

The program aims to cultivate new lines of research that can be applied locally and internationally. It will improve Chile’s access to new technologies and knowledge, create new highly skilled jobs and strengthen local capacity in the above areas.

The CSIRO Chile Research Foundation’s International Centre of Excellence in Mining and Mineral Processing is one of first four centres established under the International Centres of Excellence program. CSIRO is honoured to be selected for this centre and to be part of a prestigious group of scientific research organisations, which includes France’s Inria and Germany’s Fraunhofer Institute.
The CSIRO Chile Research Foundation’s International Centre of Excellence will be a landmark facility that will address the major challenges facing the Australian and Chilean mining industries.

With nodes initially in Santiago and Antofagasta, the Centre will draw on the expertise of its key research bodies – CSIRO, the University of Chile, the University of Antofagasta and CICITEM – to cultivate deep international collaboration and build R&D capacity across the mining and minerals sectors.

The Centre will create new bilateral business opportunities for service companies in Australia and Chile and will provide innovative solutions that will improve mine safety, reduce the environmental impact of mining and improve human capital development in both countries.

This truly world-class collaboration is supported by the Centre’s major industry and research partners:

- University of Chile
- CICITEM
- BHP Chile Inc.
- Codelco
- University of Antofagasta
- Anglo American North S.A. and Anglo American South S.A.
- Antofagasta Minerals S.A.
CSIRO Chile’s Centre of Excellence in Mining will drive holistic improvement of the minerals value chain by integrating capabilities, scientific and engineering disciplines.
The Centre has divided its research priorities into four research programs.

**GeoResources and Mine Planning**

We aim to optimise mine performance through the collection and analysis of data from mineral systems for geometallurgical modelling. We are also focused on holistic mine planning, including mining reserves, production capacity, operating cost, capital requirements and project value, in order to identify the best strategies to face geological resource depletion over time.

**Intelligent Mining Systems**

We provide technical tools for identifying risks associated with the operation of mining equipment, helping improve safety and optimise productivity. We can identify when and where subsurface deformation will develop.

**Water, Energy and Environmental Impact**

Water scarcity and related energy costs are a huge issue for the industry. This program focuses on the use of sea water as an alternative to conventional fresh water for mineral processing and heap leaching. It also investigates energy recovery from mineral pipelines, developing decision support tools for improving energy efficiency in mining operations.

**Mineral Processing and Metallurgical Systems**

Advanced notice of potentially unstable ground can aid in avoiding disruption of operations, ultimately saving lives, equipment and ores.

Advanced mineralogical and metallurgical characterisation provides valuable information for new methods to improve metal extraction and production. One of the major constraints for the sustainable growth of the mining industry is decreasing ore grades and a dependence on increasingly complex ores, which often reduce the effectiveness of processing.
CSIRO is Australia’s national science agency and is one of the largest and most diverse applied research organisations in the world. Our research is world-class and extends into almost all aspects of life and our interaction with natural and man-made environments.

With an 85-year history, we carry out research in minerals, manufacturing and materials as well as in water, energy, health, climate, space, agriculture, the environment, and information and communication technology, among others.

Our strength lies in building expert teams to tackle complex problems and apply large scale, long term and multidisciplinary science to major research challenges.

CSIRO: creating solutions to major challenges
Bringing wireless to the world

CSIRO-developed technology underpins the wireless local area network systems used in almost every laptop computer and wireless device around the world. The invention has enabled a global revolution in mobile computing and in the way we live and work.

Revolutionising money making

We have helped develop the world’s first polymer banknotes, which has features such as a see-through panel and hologram that makes counterfeiting more difficult. Today, the technology is used by at least 22 countries with more than three billion polymer notes in circulation.

Preventing iodine deficiency

Iodine deficiency can impede growth and development, particularly in the brain. Our research has shown that iodised oil injections can be used to correct severe iodine deficiency – they have also proven that mental retardation in children can be prevented by injecting patients with iodised oil before pregnancy. This method has been applied on a large scale in Asia, Africa and Latin America with over 100 million doses being given.

Tackling the ‘flu

Our expertise in determining protein structure and therapeutic design led to the development of Relenza™, the first drug successful in treating the ‘flu. Influenza affects as many as 500 million people each year.

CSIRO has a long history of creating innovative solutions to complex problems for the Australian community, which have then been applied across the world.
CSIRO is a leader in minerals research, working to increase the life of the industry through innovative solutions to processing lower-grade ores, delivering safer and more efficient mining, clean processing and value-added mineral products.

Advanced sensor system for large scale mineral ore sorting

In a world first, we have developed a large scale sensor for high tonnage ore sorting that uses magnetic resonance to measure mineral grade. The sensor can rapidly measure sections of ore that are subsequently sorted. This technology has lead to significant increases in efficiency and substantial energy and water savings.

Rapid characterisation of mineral ores using Hylogging™ systems

CSIRO’s HyLogging systems provide a means of rapid, non-destructive and objective mineralogical characterisation of drill cores and chips by using reflectance spectroscopy. Developed for mining and exploration, this specialist hardware allows collection and manipulation of large sample populations, three-dimensional and data rich information sets.

Leading minerals research
Processing nickel without sulphuric acid

We have helped demonstrate a new process that will improve the economic viability of nickel laterite processing. The process that uses nitric acid instead of sulphuric acid allows lower-grade ores to be profitably treated. This new approach promises to secure major economic and environmental benefits to the global minerals industry.

Saline water brims with sustainable savings

We have found that using saline water, instead of fresh water in mining and mineral processing could make the minerals industry more financially and environmentally sustainable. Using saline water in physical processes such as crushing and flotation could provide huge savings due to recycling and reduced consumption of water.

Pinpointing mineral riches

We have developed a new cost-effective technique – hydrochemical exploration – that uses groundwater to map underground geology and target new regions of mineral deposits. It can be used to locate gold, nickel, copper, zinc and uranium.
Asociados de investigación y desarrollo

Socios industriales principales