Australian Government

THE PRIME MINISTER'S PRIZES FOR SCIENCE

DR NICK CUTMORE, DR JAMES TICKNER AND MR DIRK TREASURE

CHRYSOS CORPORATION

2022 PRIME MINISTER'S PRIZE FOR INNOVATION

Dr Nick Cutmore, Dr James Tickner and Mr Dirk Treasure are recognised for the highly successful commercialisation of a ground-breaking technology that is transforming the mining industry.

Their innovative application of high-energy X-rays has revolutionised the way gold and other valuable metals are measured in mineral ore samples, overturning centuries-old laborious and hazardous chemical methods.

Under Dr Cutmore's leadership at Australia's national science agency CSIRO, Dr Tickner created a concept for a technology that would come to be known as PhotonAssay, a fully automated technology to measure the presence of gold and other elements in mineral ore samples.

PhotonAssay is now considered a faster, safer and more accurate way of analysing gold, silver, copper and other elements for the minerals industry.

PhotonAssay units combine X-rays, robotics and detectors into a fully automated analysis solution. The PhotonAssay technology was commercialised in 2016, marking the founding of Chrysos Corporation.

Chrysos combines engineering, software and science into its PhotonAssay technology, which is provided to mineral companies worldwide.

Before the development of PhotonAssay, the standard technique used by the mining industry for centuries was fire-assay. This was a slow and often inaccurate process which could also be hazardous both for operators and the environment.

The PhotonAssay technology led by Chrysos is fast becoming the preferred technology for gold analysis. It has half the CO2 emissions of fire-assay methods and is completely chemical-free and non-destructive.

PhotonAssay also delivers results within two minutes, while fire-assay analysis can take at least a day to complete.

In six years, Chrysos has grown from a team of five to a global company of more than 70 people.

In May 2022, Chrysos completed its initial public offering (IPO) and is now an ASX-listed company. It has delivered one of CSIRO's largest ever returns for investment into science.

The company contributes to local economies of the regions where its units are installed, including Adelaide, Perth, Bendigo and Kalgoorlie.

DR NICK CUTMORE

Dr Cutmore is driven by developing disruptive and innovative technologies with global application.

He received his PhD in solid state physics in 1981 from UNSW before joining Australia's national science agency CSIRO as a research scientist in 1983.

Dr Cutmore focused on research and development of online analysis technologies for the minerals, power generation and oil industries.

Dr Cutmore led a team of researchers in developing innovative technologies with global impact, in his role as Research Director and Program Manager at CSIRO.

At CSIRO his team was focused on trying to find innovative solutions for industrial problems using different aspects of physics.

He has been the recipient of several prestigious awards for his delivery of technology solutions to the mining and security industries, including the Australia Prize and the CSIRO Medal for Research Achievement.
Dr Cutmore held a position on the Advisory Board for Chrysos from 2017 to 2022.

DR JAMES TICKNER

Dr James Tickner joined Dr Nick Cutmore's CSIRO research program as a postdoctoral fellow in 1998. He led research into new approaches for solving challenging measurements and imaging problems in minerals and security industry applications.

Dr Tickner is driven by solving real-world problems and finding practical uses for his research.

His research that led to the development of PhotonAssay was based on a branch of nuclear physics called gamma activation analysis and involves the use of X-rays and gamma rays to analyse ore samples.

While this had been understood as a scientific concept for many decades, Dr Tickner's research created the solutions that allowed widespread industrial application of the technology.

Dr Tickner contributed to the founding of Chrysos as a start-up company in 2016 and became the company's first employee. It was during this process that he met Dirk Treasure, who would go on to become Chief Executive Officer of Chrysos.

Dr Tickner is passionate about supporting the next generation of scientists and has created new career and research opportunities during his time at CSIRO and Chrysos.

As Chief Technology Officer he leads the invention, design and production of Chrysos' technology.

MR DIRK TREASURE

Dirk Treasure is a metallurgist with more than 15 years' experience across both the corporate and technical sides of the mining industry.

Mr Treasure's early career was in novel process development in the base and precious metals industries where he designed and ran pilot-scale development programmes.

Before joining Chrysos, Mr Treasure was at RFC Ambrian where he worked with companies in the mining and resources sectors as a Corporate Finance Executive.

He joined Chrysos as the company's founding Chief Executive Officer in 2017 and has played a key role in shaping the company's business model and commercial success. Mr Treasure has grown Chrysos from a start-up to an ASX-listed company.

Under Mr Treasure's leadership, Chrysos' PhotonAssay technology was undergoing factory testing and validation all within one year – a remarkable turnaround for such complex technology. The first commercial PhotonAssay unit was commissioned in a Perth laboratory in mid-2018.

Mr Treasure became Managing Director of Chrysos at the time of the company's listing in 2022.

Career highlights

DR NICK CUTMORE

- 2021 Chair's Medal for Scientific and Engineering Excellence, CSIRO
- 2011 Winner (Mining and Energy), The Australian Innovation Challenge, the Australian
- 2009 Eureka Prize for Science in Support of Defence or National Security, Australian Museum
- 2003 Elected Fellow, Australian Academy of Technology and Engineering (ATSE)
- 2000 Minerals Innovation Award, CSIRO
- 1992 The Australia Prize, Australian Prime Minister
- 1990 Lucas Heights Scientific Society Award for Excellence in Science and Engineering, University of New South Wales
- 1977 University Medal for Physics, University of New South Wales

DR JAMES TICKNER

- 2021 Chair's Medal for Scientific and Engineering Excellence, CSIRO
- 2020 South Australian Premier's Award for Energy and Mining
- 2009 Eureka Prize for Science in Support of Defence or National Security, Australian Museum
- 2008 John Phillip Award for Promotion of Excellence in Young Scientists, CSIRO
- 2006 Research Achievement Medal (Air Cargo Scanner), CSIRO
- 2006 Frederick White Medal, Australian Academy of Science

MR DIRK TREASURE

- 2020 South Australian Premier's Award for Energy and Mining