NCI

ANNUAL REPORT

AUSTRALIA

2017
2018

WORLD-CLASS HIGH-END COMPUTING SERVICES FOR AUSTRALIAN RESEARCH AND INNOVATION

Cover Image: *A still from an NCI-produced video showing the
weather patterns of the Madden-Julian Oscillation over the
Maritime Continent.*
*All of the graphics in this video are based on simulations run
using the Weather Research and Forecasting model by Dr Claire
Vincent and Associate Professor Todd Lane from the University of
Melbourne and the ARC Centre of Excellence in Climate System
Science. The video was produced by Drew Whitehouse from
NCI's VizLab.*

NATIONAL COMPUTATIONAL INFRASTRUCTURE

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About NCI

The National Computational Infrastructure (NCI) is Australia's leading high-performance data, storage and computing organisation, providing expert services to benefit all domains of science, government and industry. We bring the Australian Government and the Australian research sector together through a broad collaboration involving the largest national science agencies, universities, and industry partners.

As the home of the high-performance computing needs of so many research organisations across the country, our highly integrated scientific computing facility provides world-class services to thousands of researchers every year. It delivers groundbreaking scientific outcomes; new, enhanced and advanced technologies; and critical insights that inform and benefit public policy. Our combination of infrastructure and expertise enables high-impact research and innovation that is otherwise impossible to undertake.

In synergy with and in support of the Australian government's premier research funding bodies, NCI supports an internationally competitive research environment that attracts and retains leading researchers in Australia.

Custodians of the nation's most powerful supercomputer, its highest performance research cloud, some of its fastest filesystems, and its largest national research data repository, the NCI technical staff are renowned nationally and internationally for their expertise. Locally, in a reflection of their passion for their roles, they are known for their constant dedication to maintaining NCI's services at all times.

Our Mission

Our mission is to deliver to the Australian research sector computational capability and enhanced services that enable transformational outcomes to be achieved for Australia's industry, its environment, its higher education sector, its public policy formulation and Australian society more broadly.

• NCI is research and outcomes driven, innovating and evolving our services portfolio to deliver on researchers' requirements, institutional research needs, and national research priorities.

• NCI delivers national benefits by enhancing the outcomes of research projects undertaken by government, science agencies, universities and industry across the country.

• NCI's research-driven agenda is underpinned by deep engagement with a broad range of research organisations, centres and communities across Australia and the world, which drives the relevance, agility and value of our services.

• NCI's infrastructure, expertise and experience deliver transformational outcomes that are world-leading.

As Australian research becomes ever more reliant on computational methods, a reliable and innovative high-performance computing platform is required. That is why NCI is pushing the boundaries of what a high-performance computing and high-performance data facility can offer. The colocation and integration of peta-scale data storage with petaflop supercomputing is critical to making data science innovation possible for Australian research.

NCI is a highly integrated, advanced computing facility, dedicated to enabling research that benefits Australia and its national science priorities. By providing high-performance computing, data storage and data services under one roof, NCI brings an all-in-one resource for compute and data-intensive research to the Australian community.

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Chair's Report

For NCI, this year cemented our position as Australia's premier integrated high-performance computing and data facility, and set the scene for the future of cutting-edge Australian research.

In January, we welcomed Professor Sean Smith as NCI's new Director, succeeding Dr Chris Pigram, Interim Director from May to December 2017. Sean, a computational material scientist and NCI user, joined us from UNSW where he was Director of the Integrated Materials Design Centre. He also brought extensive experience managing infrastructure facilities from a period at Oak Ridge National Laboratory in the US.

Normally, the appointment of a new director would be the high point for the year. However, this year the high point had to be the Australian Government's announcement of $70 million to replace NCI's aging supercomputer, Raijin. NCI is sincerely grateful to its partners, the Chief Scientist, Dr Alan Finkel, the Deputy Secretary of the Department of Education and Training, Mr David Learmonth, and many others, for recognising and championing the importance of NCI in the lead up to the announcement.

I would like to particularly thank our previous directors, Professor Lindsay Botten and Dr Chris Pigram. Lindsay argued the importance of NCI and the criticality of a Raijin replacement over many months, particularly before the National Research Infrastructure Roadmap taskforce. Following Lindsay's retirement, Chris worked tirelessly across Government to turn that recognition into the MYEFO announcement. As Chair of the NCI Board, it was a pleasure to work with such highly committed directors. The Australian research community owes them great appreciation for their service.

NCI began the year with Raijin ranked 70th globally, following the successful installation of a Lenovo cluster supported by the NCRIS Agility Fund. The replacement machine will lift this ranking considerably, thereby maintaining NCI's position as Australia's most advanced and integrated computational and data facility. However, fully realising NCI's potential requires additional investment, either directly or via our partners, in enhanced storage and data expertise: integrating compute with advanced data management and services is becoming essential. In this context, NCI welcomes the Government's continuing investment in research infrastructure announced in the May 2018 Budget, particularly the capital refresh for our sister facility, the Pawsey Supercomputing Centre in Western Australia. Both NCI and Pawsey are critical to Australia's future competitiveness in research and innovation.

Finally, I would like to thank my fellow Board members for their commitment to NCI during the past year. The Bureau of Meteorology's Dr Sue Barrell joined the Board, succeeding Dr Graham Hawke, who continues to be a strong and forceful advocate for NCI's vision. NCI thanks him for his service.

Emeritus Professor Michael Barber AO FAA FTSE, Chair, NCI Board

Director's Report

It has been an honour and a challenge to take up the Directorship of NCI in 2018. The tremendous Australian Government announcement in December 2017 of $70 million for acquisition of a new supercomputer stimulated a buoyant attitude across the sector and kick-started several major processes at NCI. These include procurement processes, a refresh of governance arrangements, and a review of how we operate and provide the services that Australian researchers rely on. More good news arrived in the May Federal Budget, with the government also committing $70 million to upgrade the Pawsey Supercomputing Centre. At the same time, it committed to underwriting sustained capital and operational funding for other parts of our inter-connected national research infrastructure sector.

Several major parts of the sector are now engaging in planning to map out optimal strategies to advance Australia's research infrastructure capabilities. These impact on areas as diverse as high-performance computing and data analytics, genomics and health, data science more broadly, materials, cellular and tissue imaging, nanofabrication, geoscience, and climate and weather. The planning processes are guided by the recent National Research Infrastructure Roadmap, led with vision by the Chief Scientist, Dr Alan Finkel,

HIGHLIGHTS OF OUR YEAR

HPC Spring Session

International partnership for climate data ESGF gets global R&D Award

NCI receives $70 million in funding from the Federal Government to replace supercomputer

2017 **SEPTEMBER** **NOVEMBER**

OCTOBER **DECEMBER**

Supercomputing 2017 in Denver, Colorado

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and supported by the committed staff within the Department of Education and Training. The research infrastructure community carries a collective challenge to ensure that critical interdependencies are addressed and accounted for, including the need for high-performance data infrastructure that supports national-scale data collections and collaborations at NCI.
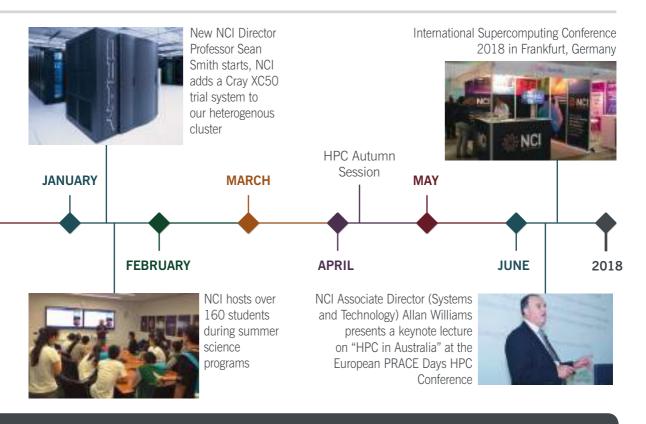
NCI's mission to support high-performance computing and data analytics at a national scale and with national impact is driven by the vision and ambition of all the people who use NCI's facilities and services, and brought to life through the dedication and expertise of NCI's specialist teams. We recognise the importance of engagement, consultation and coordination throughout the procurement process and look forward to a major step-up in HPC research capacity in the coming year.

Professor Sean Smith, FAAAS
Director, NCI

In Memoriam

NCI would like to acknowledge Development Project Manager Dr Will Douglas, who passed away in February after suffering a heart attack. Will was an invaluable member of the NCI Team and contributed significantly to many projects. We remember his intellect, drive, wit and friendship, all of which will be sorely missed. The funding allocation for NCI's next generation supercomputer is a lasting reminder of the impact of Will's drive and persistence in supporting science in Australia.

New NCI Director Professor Sean Smith starts, NCI adds a Cray XC50 trial system to our heterogenous cluster

International Supercomputing Conference 2018 in Frankfurt, Germany

HPC Autumn Session

JANUARY — **MARCH** — **MAY**

FEBRUARY — **APRIL** — **JUNE** — **2018**

NCI hosts over 160 students during summer science programs

NCI Associate Director (Systems and Technology) Allan Williams presents a keynote lecture on "HPC in Australia" at the European PRACE Days HPC Conference

Research
Outcomes and
Impact

1

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National Benefits

The unique scale and capabilities of NCI in the national research infrastructure landscape continue to draw Australia's leading computational and data scientists to address the nation's most challenging and pressing research questions. From ever-improving weather models and localised extreme weather predictions to groundbreaking discoveries in drug design and clinical treatments, NCI empowers the research community to demonstrate world-class breakthroughs across a range of scientific fields.

The importance of NCI in facilitating this research was demonstrated in the recent National Collaborative Research Infrastructure Strategy (NCRIS) survey, where users cited NCI at least twice as often as other comparable research institutions. NCI enables both complex, long-running collaborative research endeavours spanning multiple institutions, and specific projects belonging to individual researchers. Additionally, early career researchers have the opportunity through NCI to advance their careers using world-class infrastructure that would otherwise be out of their reach.

This research, carried out through thousands of projects across health, environment, science and technology innovation, and industry, provides innumerable benefits to Australia's community and to its economy. Direct and indirect use of NCI's capabilities realises billions of dollars of research investment by the Australian Government through the Department of Education's NCRIS programme. A full list of the connections between these projects and government portfolios can be found in the Appendix on page 98.

While the value of NCI is well recognised by the research community, the Federal Government particularly highlighted the national benefit in its 2016 National Research Infrastructure Roadmap. This has resulted in funding for the next supercomputer upgrade, as well as a long-term government strategy to provide significant funding to NCI into the future, as provided in the May 2018 Federal Budget.

NCI provides critical infrastructure and expertise that enables and accelerates the research process through large-scale simulations, model improvements, code optimisation, software management, data analysis capabilities and high-impact visualisation. An integrated computational and data science infrastructure, coupled with a concentration of expert staff with nationally unique skills, provides the breadth, stability and future-focus that researchers rely on to achieve their ambitious goals.

NCI's staff continually strive to better harness the full power and capability of our high-performance infrastructure and large data collections. This involves ongoing development of our data access and analysis tools to make the data collections stored at NCI more useful than ever before, and advanced integration and management of our high-performance computing systems. Collaborative developments ensure that the NCI platform is designed from the ground up to enable nationally significant research for the priorities of our community, and to provide the ongoing innovation necessary to meet future demand.

Supercomputer helps bring genomic medicine to the mainstream

One of the biggest causes of heart disease in Australia will now be easier to diagnose thanks to NCI's integrated data storage, supercomputer and cloud computing systems.

A collaboration between two major Australian medical research institutes and Harvard Medical School found that whole genome sequencing is an effective method for diagnosing dilated cardiomyopathy.

The newly applied genetic test uses a patient's entire genome sequence to pick up more genetic changes, or variants, than other methods. This makes diagnosis more likely, and makes it easier for researchers to learn more about how the disease works.

The research used NCI as a platform to bring the genomics and bioinformatics expertise from the Garvan Institute of Medical Research and the heart disease biology and clinical expertise from the Victor Chang Cardiac Research Institute together. The primary innovation that NCI supported was the development of ClinSV, a bioinformatic method to identify a class of large genetic changes, known as structural variations. This assisted in diagnosis of one patient's heart disease, and has subsequently been clinically accredited.

Dr Mark Cowley, from the Garvan Institute's Kinghorn Centre for Clinical Genomics, says that NCI played an important role in the outcome of this project.

"NCI was critical to this research. We were able to develop and optimise novel bioinformatic approaches to understand the data, leveraging the high-performance platform and data storage capability at NCI," he says.

"In addition, being able to access the data in a virtual environment using NCI's cloud computing made sharing data with collaborators that much easier."

The knowledge and skills that the researchers gained from this work will be applied to look deeply at the genetic causes of other diseases, including kidney, neurological and developmental diseases, and cancer.

Dr Cowley says, "Whole genome sequencing can be applied to the diagnosis of almost all genetic conditions ."

As we get further into a world of genomic medicine, the power of NCI's world-class computing and data storage facilities will continue to be in high demand.

Global climate data used for agriculture research to benefit the nation

Global climate change data provides unique insights about our changing environment over long time-scales, and helps us plan for the future. The international climate change data set CMIP6 is a collection of model data that is assembled from the most advanced climate models around the world and provides our best understanding of global climate change.

Due to be released later in 2018, the CMIP6 collection will be stored at a small number of international data analysis sites, including NCI. NCI will be organising the up-to-date data and providing it to researchers, along with all the data analysis tools and computational power needed to analyse this vast amount of information.

For researchers at NCI, the data particularly covers many different aspects of the Australian climate, with valuable information about weather patterns, temperature, humidity and more.

CSIRO has a major project as part of their agriculture and food research programs to examine the impacts of a changing climate on our agricultural landscapes. For example, the shift in places that support wheat growing, and adaptation strategies to be put in place to reduce the heat stress effect on milk production in dairy cattle.
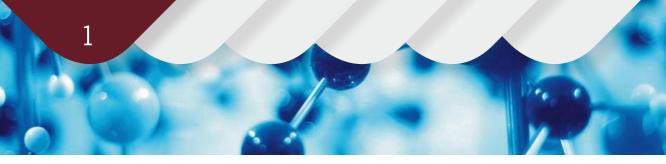
All of these lines of inquiry require a reliable access hub for data analysis and sharing. CSIRO's Dr Jaci Brown says, "NCI's data management platforms and quality control mechanisms provide the ideal home for the mind-blowing amounts of data that make up CMIP6 and, importantly for us, the data needed to confidently analyse the impacts of climate on agriculture."

Having a single home for the international reference data is the only way for teams of researchers in various locations to access the large volumes of data coming in from diverse sources. It is also the best way for them to use advanced analysis tools that can work with the entire set of information.

Without NCI specialists building the required data-rich environment, this research capability would be impossible. Furthermore, this streamlines the analysis process that now allows the researchers to focus on their areas of expertise instead of other time-consuming data management aspects.

NCI's data platforms are the ideal home for high-performance scientific datasets such as CMIP6. By taking care of a large portion of the data acquisition, storage and management processes, NCI enables efficient, data-intensive research into the impacts of climate change.

Impactful Science

Enabling researchers to achieve their goals is central to the NCI mission. Through them, our world-class infrastructure, systems and expertise become tools for producing impactful science. Keeping pace with our users' needs, the scope of which continues to increase with the pervasive growth of computing and data analytics across all fields, is essential for them to fully utilise NCI's capabilities and deliver scientific outcomes.

Thousands of researchers every year run compute jobs and access data services at NCI, using the systems available to advance their work across every field of science. Our user base includes universities, government agencies, industry groups and medical research institutes, all of which rely on NCI's high-performance computing (HPC) and data-intensive research platforms and services.

We are a key part of the research capability of the university sector. Recipients of dozens of grants from the Australian Research Council and the National Health and Medical Research Council rely on access to NCI's high-performance computing and data infrastructure to advance their workflows. Tens of millions of dollars each year in university-based science funding requires a large-scale, well-integrated HPC-Big Data infrastructure to enable groundbreaking, internationally recognised contributions to science.

Of the more than 750 million hours of compute time that NCI makes available to researchers every year on our Raijin supercomputer, around 110 million are allocated through the National Computational Merit Allocation Scheme (NCMAS). This nationwide scheme offers researchers from any publicly funded research organisation the opportunity to apply for computational resources on the country's HPC platforms, including NCI, the Pawsey Supercomputing Centre and smaller, specialised systems, MASSIVE and Flashlite. NCI's contribution to the scheme is more than half the total resource allocation. In 2018, 133 projects received an allocation on Raijin at NCI, giving these research teams the resources they needed to do the most impactful work.

Through long-running collaborative efforts in specialised domains such as climate, weather, satellite Earth observation and the geosciences, there is now a growing list of cases that demonstrate how NCI's transdisciplinary approach and focus on interoperability contributes to science outcomes for both research and emerging scientific services. This work is continuing with several new projects commencing in 2018 that will further exploit the world-leading data advantage developed at NCI, and focus on improving the ability for non-experts to access and use the data. This involves making research data more accessible with new tools and creative visualisations. These not only assist researchers to advance collaborations and generate new scientific insights, but also to communicate the implications of their findings with decision- and policy-makers. (See DEVL Case Study on Page 32 and GSKY Case Study on Page 44).

NCI also supports new and established users through our regular training workshops. Multiple training sessions each year help develop and refresh the skills of researchers to most efficiently use HPC resources. These tutorial-style training sessions, held both at NCI and at other locations in community-led workshops, ensure that researchers get a solid foundation for the continuation of their work.

Enhancing catalysis for industry impact

A major use case for high-performance computing in research comes from the detailed modelling of atomic interactions. Whether for materials design or chemical analysis, being able to understand the processes taking place within a chemical reaction at an electronic level is crucial. NCI's supercomputer provides the backbone for the research helping us understand and improve our chemical and industrial processes.

Dr Chenghua Sun from the Swinburne University of Technology is specifically interested in the structure and behaviour of catalysts during a chemical reaction. These materials, such as the metallic pigment titanium dioxide, are used to kick-start chemical reactions based on the interactions of liquids and gases with the physical surface. The shape of its surface, including any defects or deformations, plays a large role in the catalyst's effect during the reaction.

To understand exactly what catalysts are doing during reactions, they need to be modelled in various high pressure and high temperature situations. Then, researchers compare the model output with images taken of actual reactions using an electron microscope.

Dr Sun says, "High-performance computing can offer electron-level understanding and provide an exact explanation for the observed data that we see in our experiments."

Research combining modelling and experimental data is much more valuable than research focusing on either one on their own. By allowing researchers to extend their focus beyond the pure experimental methods, NCI is making more ambitious and exciting research possible.

Dr Sun says, "In the future, I wish to extend my current catalysis studies to include more reactions, like ammonia synthesis at room temperature, and more complicated cases like methane combustion. These topics are of paramount importance for industry."

Monitoring global water resources with new world-leading high-resolution model

High-resolution environmental modelling has long been a challenge for Australian researchers, and benefits hugely from access to NCI's data and compute infrastructure. It requires the ability to manage and access increasingly large-scale, high-resolution and diverse data sources combined with a research platform suitable for data-intensive analysis.

Professor Albert van Dijk, from The Australian National University, has been using NCI for many years to drive his research into environmental processes such as rainfall, land cover, bushfires and water flows. He led a group of international collaborators in developing a model capable of tracking all of the water on the Earth's land surface, measuring the quantity of water present in rivers and catchments. Being able to run this new world-class high-resolution water availability model

at a global scale relies on the combined computational performance and highly optimised National Reference Data Collections at NCI.

Professor van Dijk says, "We want to help bring about more sustainable water management practices around the world. The things we can achieve with NCI's strong data and compute platform are truly world-leading. The expertise and effort we put into making best use of this valuable high-performance infrastructure opens so many new research possibilities for us."

The major innovation of this model is the incorporation of additional satellite data to the model's workings. That data – satellite readings easily accessible from within NCI's systems – enables much more reliable estimates of water storage and use by wetlands and irrigation than anything previously possible.

These water features have previously been difficult to accurately model, in large part because of the way they change dynamically over the course of days to years. Now, water managers around the world can use this modelling data to better understand their water resources and improve management practices.

South-west Tasmania's Lake Gordon, one of the largest lakes in Australia.

Growth in the NCI Partnership

The NCI Collaboration plays an essential role in supporting NCI's mission to provide nationally integrated high-performance data, storage and computing services to Australian science, government and industry. This partnership brings together funding from The Australian National University, CSIRO, the Bureau of Meteorology and Geoscience Australia, which is augmented through additional investments by most of the research-intensive Australian universities and the Australian Research Council (ARC).

NCI now supports an even broader mix of computational science and research collaborations with more than 30 national science research organisations and several start-up businesses, making up well over 6000 researchers directly using the highly integrated infrastructure within NCI. Furthermore, an even larger community benefits from the national reference data collections via our high-speed open data services (see Data Services on page 30).

The continuing growth in the NCI partnership reflects the high quality, reliability and reputation of the NCI services throughout the scientific research sector. This year, the new ARC Centre of Excellence in Climate Extremes extends the work of the previous ARC Centre of Excellence in Climate Systems Science and its alignment with the climate and weather priority collaboration at NCI. The ASTRO3D Centre of Excellence also continues the astrophysics association, and extends on its predecessor, the ARC Centre of Excellence for All-Sky Astrophysics. In joining NCI, they join the other continuing Flagship Centres – the Centres of Excellence for All-Sky Astrophysics, Electromaterials Science, Particle Physics at the Terascale, Nanoscale Biophotonics, and Ultrahigh Bandwidth Devices for Optical Systems. They share in 25 million compute hours on NCI's high-performance computing (HPC) systems.

A still from the NCI-produced video showing weather patterns over the Maritime Continent, based on data from Dr Claire Vincent's research at the University of Melbourne and the ARC Centre of Excellence in Climate System Science.

NCI continues to maintain strong connections with the HPC industry, working collaboratively with IBM, Fujitsu and Cray to provide proof-of-concept testing for some of their next-generation products. The knowledge gained through this industry engagement leads directly into optimised performance for our operational systems and better decision-making around future equipment purchases. NCI also partners and collaborates with our sister centre in Western Australia – the Pawsey Supercomputing Centre – as well as regional and other international HPC centres to foster exchanges of information and mutual development of leading edge expertise.

The NCI Collaboration and growth in partners, combined with NCRIS investments and the support of the Federal Government, highlights the importance of the NCI facility to all facets of Australian research. The major refresh in 2019 of supercomputer capability, funded by the Australian government, coupled with the broadening of NCI's scalable data capability, will ensure we continue to meet the needs of our client research communities and position NCI for further growth in these vital partnerships. Preparing for this expansion will also require NCI innovate to accommodate the rapid growth in demand for leading computing and data services.

Producing the electronics of the future

Researchers from one of NCI's newest Affiliate Partners, the ARC Centre of Excellence in Future Low-Energy Electronics Technologies (FLEET), are using the NCI supercomputer to discover the building blocks of our future electronic devices. In effect, they are using a high-energy electronic device — the country's most powerful supercomputer — to help invent the low-energy equivalents of the future.

The electronic devices that FLEET is working on include new kinds of computer transistors that make use of different kinds of physics. They are also working on biosensors, new light-based devices, and are even developing new fabrication techniques to bring the creation of these tiny, delicate components closer to reality.

Because so much of this work is happening at the nanoscale, producing the materials and measuring their behaviour is incredibly complex. For that reason, FLEET researchers use complex atomistic and molecular modelling on the NCI supercomputer to help them understand the materials they are working with.

With modelling results in hand, researchers can then use them to guide experiments and inform their understanding of the results. In many cases, using a supercomputer is an essential first step within the research process.

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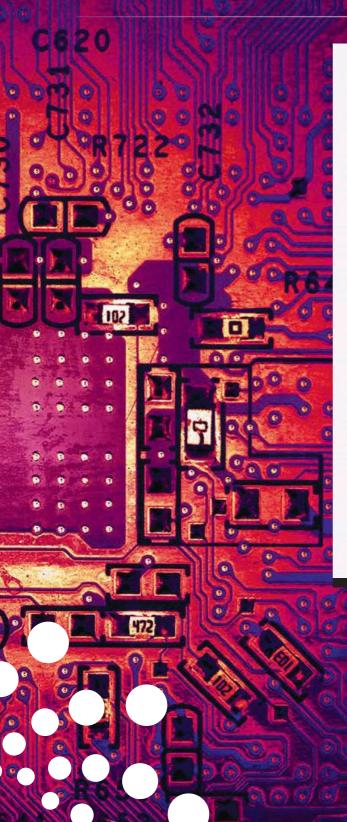
Dr Yuefeng Yin works in the Computational Materials group, led by Associate Professor Nikhil Medhekar at FLEET, focused on understanding 'Atomically Thin Materials'. These materials, such as graphene, form large sheets only a few atoms thick, and can be used for many different purposes. In this case, Dr Yin and his colleagues have been looking at how graphene can be used to detect DNA or RNA based on their electronic interactions.

Dr Yin and Associate Professor Medhekar say, "These calculations are all about us using physical principles to create new materials. We use our theoretical understanding to see what is possible, through the computer modelling. As such, we are very dependent on the NCI supercomputer to progress our research."

The fields of advanced manufacturing and materials design are being driven forward by innovative Australian researchers from initial conception through to product delivery. NCI's supercomputer systems and expertise continue to play a large role in supporting this exciting research.

Innovations
Enabling New
Science

2

NCI has augmented its large data repositories with several new high-performance filesystems, bringing total data capacity up to 50 petabytes.

System Enhancements

Central to NCI's mission of providing leading high-performance computing services to the Australian research community are our ongoing enhancements to our supercomputing capability.
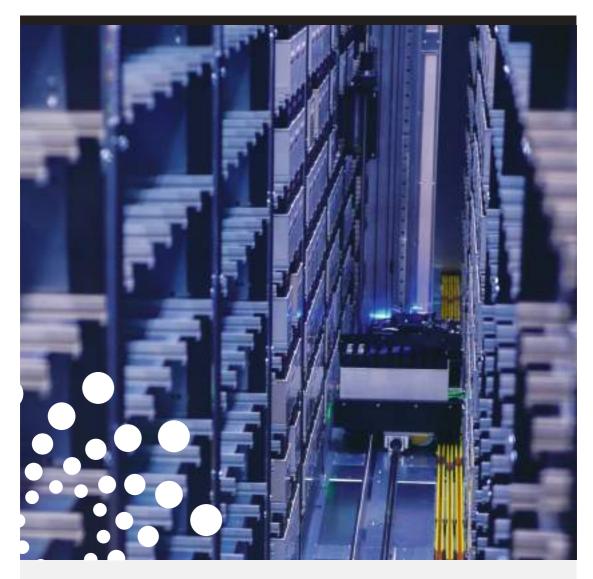
Following the December 2017 announcement of funding from the Federal Government for the purchase of a replacement supercomputer, NCI is in the process of tendering for that system.

In January 2018, we received delivery of a Cray XC50 system. Comprising 56 nodes with Skylake Gold CPUs, the Cray system is almost identical in specifications to the Bureau of Meteorology's operational weather forecast supercomputer. Having a matching system in place at NCI allows us to work more efficiently on the Bureau's weather model code. Other data analytics uses are also planned for the Cray system.

Additionally, we continue to trial new hardware, driven by our close vendor relationships. This allows us to test pre-release versions of their new products, and gain experience running our operating and file systems on different hardware configurations. This year, we have collaborated with Fujitsu and Lenovo on proof-of-concept testing for various versions of their new, water and immersion-cooled hardware.

NCI has also installed around 90 kilowatts of solar panels on the roof of our main building, in partnership with The Australian National University. The solar panels provide renewable energy directly into our data hall, helping reduce both the operational costs involved in running our core infrastructure and the associated greenhouse gas emissions.

NCI's Innovative Data Storage Systems
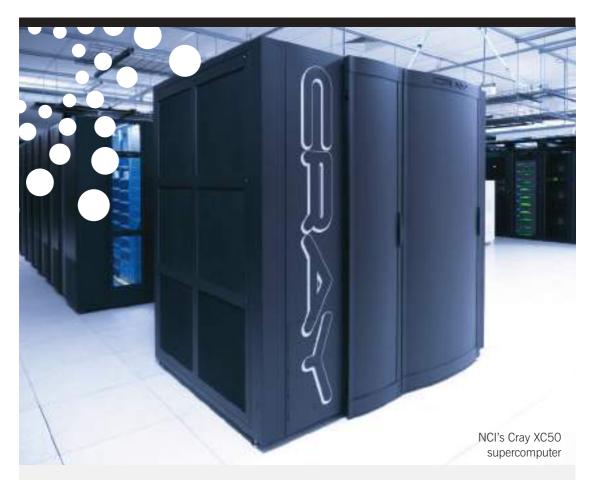
NCI is continuing to innovate on our data storage systems, with a recent upgrade to the magnetic tape library used to store NCI's archival project data. The new system, a Spectra Tfinity library, gives NCI the capacity to store up to 120 petabytes of archival data. This sits alongside the 50 petabytes of rapid-access hard drives making up NCI's filesystems.

As NCI continues to grow, we are storing new data at a rate of over seven terabytes per day. This includes a daily influx of satellite imagery, as well as modelling data, historical earth observation data and human genomes. Our users make the most of the large data collections for a huge variety of environment, agriculture, health and physics research domains.

The integrated data and compute capability available at NCI makes this possible: by having research data stored in the same place as the computer used to analyse it, we enable much faster and more reliable data workflows. Whether it be to understand vegetation regrowth after flood events in the Murray–Darling Basin or to create an instantly searchable database of daily satellite images of Australia, NCI's high-performance data systems put the information where researchers need it.

A mix of magnetic tapes and hard drives allows NCI to store all of the data we need in an effective way. By storing archival data on tapes, we have a way to safeguard valuable historical data for the future without slowing down the high-performance filesystems with excess files. The layer of data discovery and cataloguing tools that we provide makes finding the right data easy for researchers. It speeds up their scientific process and even opens them up to accessing new and interesting datasets they can incorporate into their work.

In addition to upgrading our own tape library, we are collaborating with Geoscience Australia (GA) to install one on their site as well. This library, connected to the NCI data centre via a dedicated high-speed fibre-optic connection, will provide an extra layer of data security to the key datasets we store. The most significant datasets, in particular those belonging to GA and other partners, will be backed up in that tape library.

Both the GA library and NCI's new Tfinity library are crucial for the increasingly large amounts of data we expect to be storing in coming years. Cooperation between the repositories of key scientific data and its users is a crucial step in removing barriers to the research process. As datasets become even bigger, having reliable, long-lasting repositories will be ever more important to all of Australia's research efforts.

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NCI's Cray XC50
supercomputer

Investigating new supercomputing possibilities

NCI is continually looking to enhance our computational offerings, by providing researchers the best tools to suit their needs. In early 2018, we purchased a Cray XC50 supercomputer with the aim of providing dedicated compute for certain discipline-specific codes.

In particular, NCI's weather forecasting partners the Bureau of Meteorology and the UK Meteorological Office have their own shared set of codes that have been optimised for this kind of system. Once the machine is up and running, we envisage that weather researchers will be able to work even more efficiently on improving the weather models that we rely on everyday.

The Cray system opens up new possibilities for improved collaboration with major national and international partners. Combined with our many years of experience optimising and scaling up the weather forecast codes, this promises even more interesting and rapid development in the coming years. This addition to NCI's heterogeneous cluster provides yet another solution for Australian researchers to conduct their research on the platform best suited to their workflows.
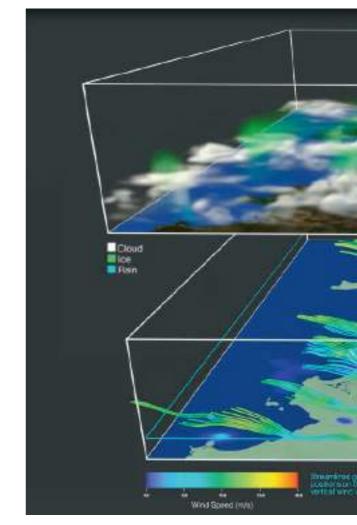
Data Services

In 2017–18, NCI has continued to play an important role in several major national data infrastructure and innovation projects. Development of this capability was kick-started in 2009 by the Federal Government's Education Investment Fund Super Science Program and, more recently, through the now completed NCRIS Research Data Services (RDS) project.

An outcome of our particular focus on data services, addressing both NCI and RDS goals, was the creation of a new high-performance data service enabling cross-disciplinary access to highly valued national reference data collections for both intensive usage on site and remote access via web services. This service required the development of software to better connect the high-priority datasets together. As a result, researchers have clearly increased their use of national data collections. These are collections that would otherwise only have been accessible to a more limited set of HPC-enabled computational and data scientists (See Data Access Table on Page 96).

The new data service aligns with the internationally recognised FAIR principles (Findable, Accessible, Interoperable and Reusable) for data, which aim to increase the connectivity and usefulness of data across research domains. The adherence to globally recognised catalogue standards ensures these important data collections are more easily discoverable through the Research Data Australia discovery portal, as well as other international portals.
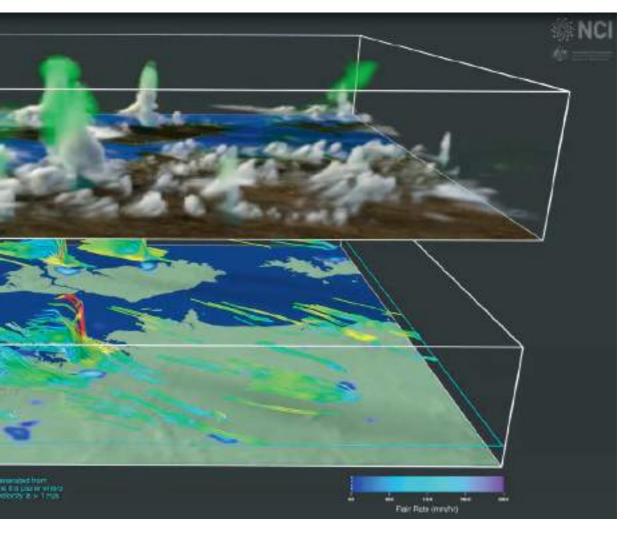
Our National Environmental Research Data Interoperability Platform and GSKY data service (see Case Study on page 36) both efficiently take advantage of the large body of data assembled at NCI. The combination of modern data standards and state-of-the-art data analysis software working with the data

ensures that it can be readily re-used by the broadest set of users, workflows and external use-cases.

Over the past year, NCI has maintained a strong focus on Earth sciences, from geophysics through to climate simulations. The rapid growth in international access to data from large-scale NCI-based modelling, processed satellite imagery and products, and sharing of our reference datasets requires dedicated specialist resources. These resources are crucial for improving and maintaining the data access methods and analysis tools for use beyond individual research projects. NCI

A still from an NCI-produced visualisation of weather in Darwin, based on Bureau of Meteorology research around improved weather models for Australian capital cities.

thus plays a key role within the Australian research community of providing data infrastructures and specialist management teams to support communities, projects and institutions from every scientific discipline.

NCI focuses on developing new ways to improve the quality and accessibility of data across domains. This helps remove the need for individual research groups to duplicate the underlying computing and data infrastructures in their own laboratories. These ongoing improvements to Australian data-intensive research open the way for multi-disciplinary collaborations and innovative new research to take place in coming years.

NCI key for National Virtual Laboratory Projects

In 2017–18, an ANDS-Nectar-RDS (now the Australian Research Data Commons, ARDC) initiative called for applications from the e-research sector to enhance existing research capability for "a world-leading data advantage". As a result, NCI and its collaborators in Climate, Geoscience and Marine science responded with proposals for development projects in those three of NCI's priority research communities. This led to three new Data-Enhanced Virtual Laboratories (DEVL): the Climate Science DEVL, GeoDEVL and Marine DEVL.

These build on existing middleware, data services, data management and HPC infrastructure at NCI. They will further increase the benefit and impact of NCI's role in developing the national reference data collections, and enable faster access to increased volumes of existing climate, weather and satellite data.

Climate

The Climate Science DEVL, led by NCI, is a major software and data-based research infrastructure project that will enable Australian researchers and policymakers to analyse the next generation of international climate data. This project builds on a previous community project at NCI: the Climate and Weather Science Virtual Laboratory. The project will augment the existing systems to allow researchers to contribute their model and data analysis to the World Climate Research Programme's Coupled Model Intercomparison Project Phase 6 (CMIP6). These can then become inputs to the Intergovernmental Panel on Climate Change's forthcoming 6th Assessment Report.

The majority of Australia's climate research community will rely on two key enhancements for CMIP6 that are being developed in the DEVL.

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First, an automated system to handle petabytes of CMIP6 data that will be made available at NCI, reliably replicating the data over the high-bandwidth international science networks that connect NCI to the rest of the world. Secondly, DEVL enhancements in software will enable easier data analysis.

Geoscience

AuScope's GeoDEVL project will enable the data discovery, delivery and computational analysis that underpins innovation in the sector. It forms the first part of a multi-year initiative to improve our understanding of the Earth under the surface and improved detection and extraction of important minerals, gas, coal and water.

NCI's focus has been a 'data-rescue' activity to release a major magnetotelluric data collection, dating back to 1993. Over its lifetime, this dataset cost several millions of dollars to collect, and is now being made available for the first time in a modern high-performance format for use by NCI researchers and geological survey organisations.

Marine

The Marine Virtual Laboratory (MARVL) will be developed by the Integrated Marine Observing System of Australia (IMOS) with NCI, the Bureau of Meteorology, CSIRO and others. This will enable it to develop data and software services to underpin the Australian National Shelf-seas Reanalysis (ANSR), an important element of the national ocean modelling system.
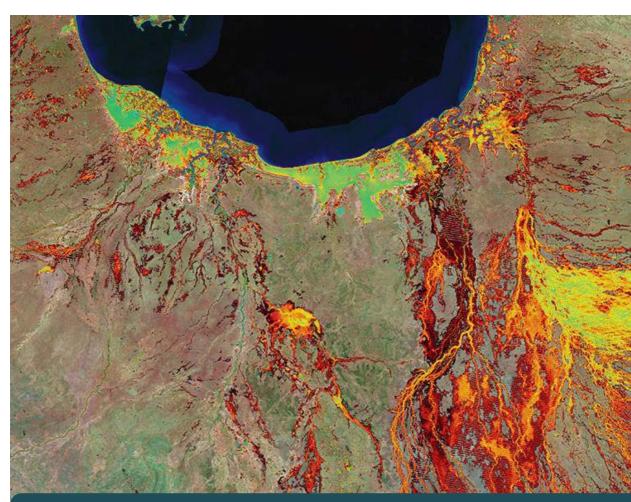
The data services provided through this project will enable much improved opportunities for investigating the marine environment.

Data Science

The role of NCI within the research community is to enable otherwise impossible research. Our data activities fit within that scheme: we are constantly building new and better ways to extract information from data. The growth in data science techniques used by the research community over recent years has required improvements in the quality and organisation of the data they use.

Our large reference datasets are suitable for use in a range of diverse digital environments and analysis techniques. This approach enables as many different methods as users need for extracting information from data, from traditional scientific packages, through to the application of machine learning.

Our efforts to provide easier access to research-ready data is already enabling new approaches to scientific problems and will continue to lead the way in innovative data-intensive research. NCI is home to a range of digital environments that make it easier for researchers to dig into data with software and analysis tools. NCI hosts both general access and discipline-specific virtual laboratories that underpin this new mode of data analysis and access. NCI's Virtual Desktop Infrastructure, the Climate and Weather Science Laboratory, the Virtual Geophysics Laboratory and the All-Sky Virtual Laboratory are examples of these widely used platforms.

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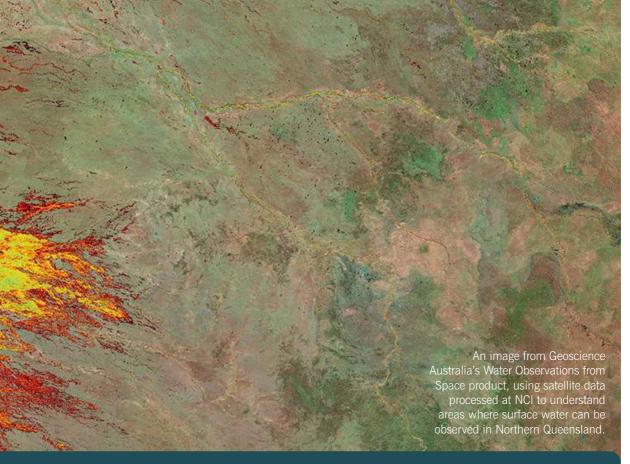
INNOVATIONS ENABLING NEW SCIENCE

Sophisticated visualisation is an important enabler for data science: it can allow improved understanding of complex structures that is hard to extract from the vast raw datasets; provide the ability to predict trends based on many moving variables; and deliver transformative modes for communication of these results in a scientifically valid manner. In the past year, NCI's skill set for visualisation of data has become an increasingly valued and sought-after capability for research in climate, weather, geosciences, phenomics, environmental sciences and materials science. It has helped with understanding the complexity of both experimental and simulation data, yielding groundbreaking insights. NCI visualisations facilitate the integration of datasets from different sources in a way that would otherwise be analytically difficult.

In 2017–18, our visualisation team have worked on a range of complex datasets to assist researchers with their work. These range from high-resolution weather data used by the Bureau of Meteorology in their upgraded 1.5-km weather prediction model, through to the visualisation of fossilised beetles in amber using very high resolution CT-scans of the samples.

This year has also seen an extension of NCI's visualisation techniques through the use of new virtual reality (VR) headsets that allow researchers to explore data in ways that were previously unimaginable (See Case Study on page 38). Several examples of the new VR capability of NCI's visualisation team were on display at the ARC Centre of Excellence in Climate System Science Showcase at Old Parliament House in June 2018.

An image from Geoscience Australia's Water Observations from Space product, using satellite data processed at NCI to understand areas where surface water can be observed in Northern Queensland.

A world-leading satellite imagery platform

Geoscience Australia is developing the world-leading Digital Earth Australia (DEA) platform to provide satellite data and images of Australia for research, industry and government use. Spatial information of this kind provides an in-depth understanding of changes in the environment. The data, once prepared and analysed using NCI's high-performance computing, provides a wealth of information to the Australian community. In addition, NCI's data facilities store a large portion of the satellite imagery accessible through DEA.
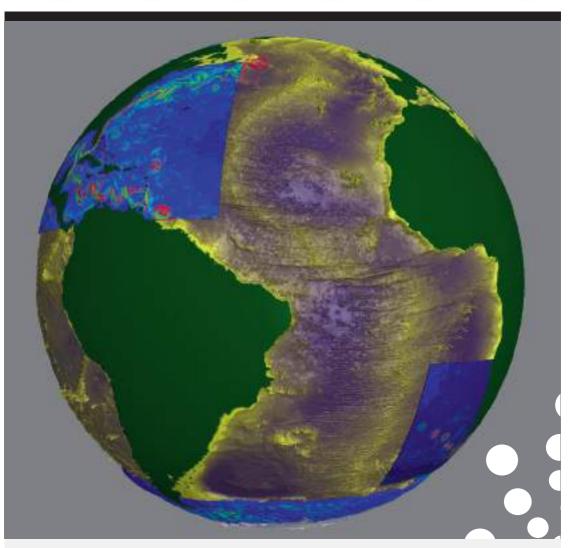
The resulting platform will create an easier way for farmers, land managers, researchers and government to explore changes in the Australian landscape, from water usage to erosion, bushfire patterns and river flows. By making analysis-ready data available to the community, DEA reduces the cost and time involved in dealing with the complex and varied volumes of satellite data.

Our contribution to DEA also comes in the form of an NCI-produced piece of satellite data management software. GSKY, an open-source geospatial data server, makes it possible to quickly and efficiently search through large, disparate sets of geospatial data, and bring them together into a coherent whole (read more in the Case Study on page 44). This provides yet another simplification to the time-consuming workflow of searching for appropriate datasets.

Digital Earth Australia showcases the power of big data and how computational methods can be used to increase our knowledge of the local environment. Issues such as food security, climate change and urban development will impact on many facets of Australian life. Data platforms such as DEA give us a strong foundation on which to base our responses to these future opportunities and challenges.

The Northern Territory's West MacDonell Ranges in an image captured by the European Space Agency's Copernicus satellites.

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A still from NCI's virtual reality ocean visualisation, showing ocean currents in the Atlantic Ocean.

NCI VizLab – Virtual reality innovation brings oceans to life

NCI's expert scientific visualisation team is developing a virtual reality (VR) experience to let researchers dive right into their ocean datasets. The VR experience, developed alongside ARC Centre of Excellence for Climate Extremes researchers, allows them to see in amazing detail the flow of water in some of the world's most significant ocean currents, including the East Australian

Current and the Gulf Stream in the North Atlantic.

The experience is based on the exact same models that the researchers currently use to understand water circulation, heat exchange, nutrient transfer, carbon uptake and many more environmental variables. Becoming more deeply immersed in the motion of

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water and seeing how it changes over time provides a powerful new way to understand these incredibly complex datasets.

Currently, the data produced by ocean models is analysed through graphs and spreadsheets. But it makes a lot of sense to represent physical data in a visual, interactive medium. By putting on a VR headset, you can almost swim through the ocean and explore its key features, like different water temperature layers or ocean currents.

This allows you to much more easily fathom the complexity of the ocean systems, without the need to understand all the technology that makes this possible. NCI handles all of the computing power, data organisation and model development needed to assemble these datasets into such a tangible and interactive form.

NCI is developing our experience with

VR technologies as a brand new way of interacting with scientific datasets. Whether it is for looking at meteorological activity, plate tectonics or tree growth, VR opens up a new way of interacting with higher dimensional data – from extremely small to global scale, or from fast to geological timescales that would otherwise be difficult to interact with in a tangible way. It also opens up the possibilities of using new kinds of data in completely unexpected ways.

Through our long-term understanding of effective scientific visualisation techniques, and now combined with VR technology, we are allowing researchers to look at their data in new ways. This augments the tools we use to help researchers get the most information possible from their models and data, which helps to raise the questions that will become part of future scientific discoveries.

An image of Cyclone Debbie as it struck eastern Australia on 27 March 2017, captured by the European Space Agency's Sentinel 3 satellite.

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Computational Science

NCI's position as a hub for high-performance computing expertise is highlighted by our role in the development of computational science at the largest scales. We are well-placed to address some of the most significant scientific challenges – challenges that require the full capability of our HPC environments.

Our work in computational science aims to transform leading scientific applications by modifying and optimising their code, making it possible for them to better take advantage of HPC resources when running at large scales. Focusing on the most computationally and data-intensive codes, this work looks to continually improve the scientific software's HPC readiness so that the user community can focus on its research while seamlessly deriving optimal benefits from new generations of hardware. Such improvements can range from increasing modelling resolutions to enabling more efficient use of data for processing, assimilation or analysis.

These improvements are possible due to decades of deep expertise and engagement alongside the ongoing investment in the latest high-performance computing technologies. Ongoing efforts to improve software, algorithms and numerical methods are essential for making progress to meet current and future needs.

In 2017–18, NCI's work has centred around a suite of weather and climate models. These are the UK Meteorological Office's Unified Model and associated coupled models, water models including near-real-time storm surge predictions, the ACCESS Climate model (CM2), CSIRO's Earth System Model (ESM1.5), Ocean Maps model (OM2) and the Bureau of Meteorology's BARRA reanalysis (see Case Study on page 42). We have also produced a world-leading data service, GSKY (See case study on page 44), an ultra-performant service that realises emergent real-time analysis through the merging of HPC and data services. This service has initially been focused on accessing complex earth observation datasets, and the community understanding of its extended use for other fields of data intensive science is expanding rapidly.

These advancements to some of our most important national models have flow-on benefits to many different communities in Australia and around the world. Our improvements to the weather model are often shared with the national weather forecasting agencies of the United Kingdom, New Zealand, India and South Africa, and the benefits are felt each time the new weather model is run.

NCI expertise helps understand weather patterns

The Bureau of Meteorology is in the process of producing a reanalysis that allows us to look back at Australia's weather for the past three decades. Built using Australia's national weather forecast model (Australian Community Climate and Earth-System Simulator, ACCESS), this dataset will give businesses, emergency services and farmers a consistent set of past weather data to guide their future decisions.

The Bureau of Meteorology high-resolution Atmospheric Regional Reanalysis for Australia, or BARRA, will be a hugely valuable resource: weather datasets for the entire country going back to 1990. It will be especially useful for anyone interested in the kinds of environmental variables that are difficult to measure directly, like wind speeds at different heights and soil wetness. The software optimisation expertise, data management and high-performance computing capacity of NCI are central to BARRA's success.

20km

2011-02-02 20:00

BAR
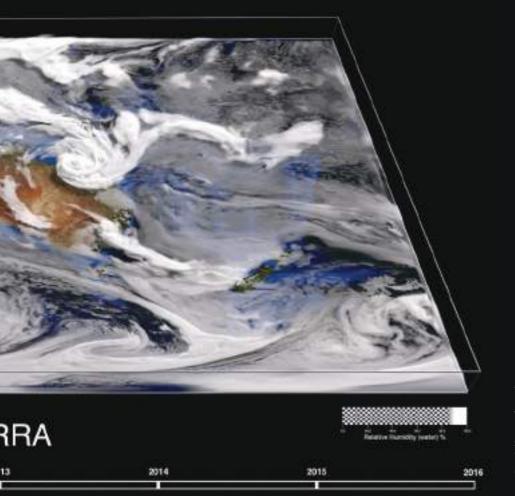
2010   2011   2012   20
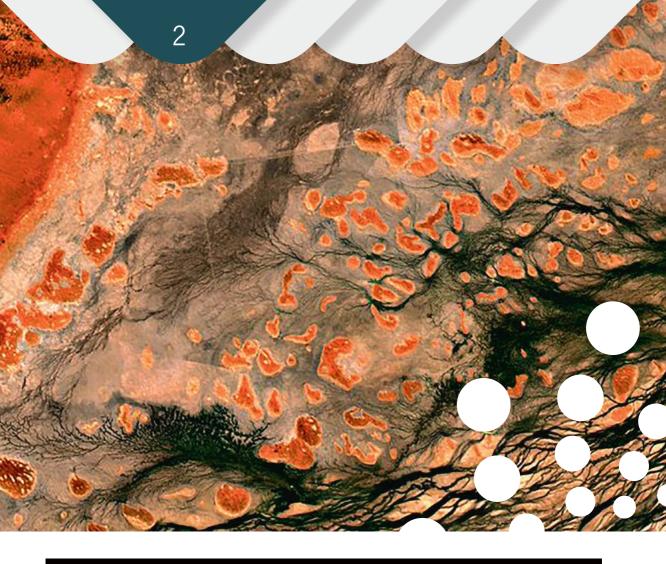
NCI works alongside Bureau staff to improve the weather modelling code that is at the core of the reanalysis. This includes decreasing the code execution time by up to 30%, leading to more efficient use of compute resources. In particular, NCI's expertise provides the supercomputing power and know-how to properly implement all of the improvements at a large scale.

Dr Dörte Jakob, Manager of Advanced Climate Services at the Bureau of Meteorology, says "Running BARRA effectively required us to make use of all of NCI's capabilities, from high-performance computing for this high-resolution reanalysis code, all the way through to the excellent data management systems, data archives and visualisation services."

The close partnership between NCI and the Bureau of Meteorology allows for important advancements in some of our most critical national infrastructure. The BARRA Reanalysis will benefit a range of sectors, including emergency services, energy companies and agricultural businesses, and through them, the Australian community.

A still from an NCI-Bureau of Meteorology visualisation of the BARRA Reanalysis, showing Cyclone Yasi over northern Queensland in early February 2011.
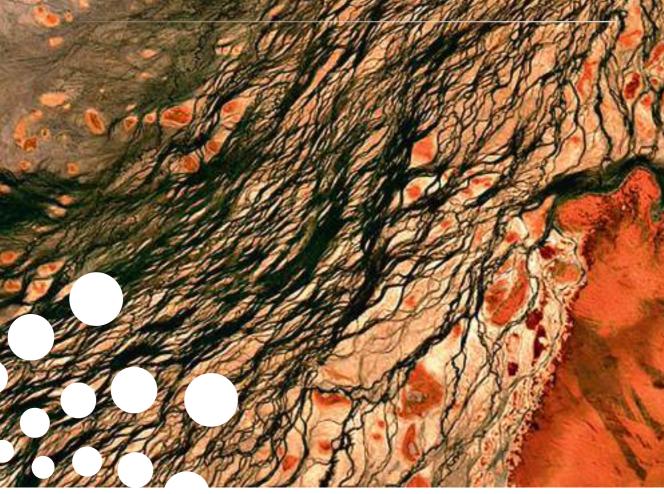
NCI's groundbreaking new data access tool

When researchers first started working with large datasets covering Australia's seven million square kilometres, they had very few ways to deal with that data efficiently. It came to them in large chunks and messy formats that made it incredibly hard to narrow in on particular locations or data points. Nowadays, with multiple satellites beaming images down to us several times per day, this big data problem is only getting worse.

That's why, as part of our mission to make it easier for researchers to get the most out of their data, NCI has produced a world-leading software tool for accessing and viewing a huge range of geospatial data. GSKY (pronounced ji-skee) is a software

system which capitalises on NCI's tightly integrated computational and data infrastructure to provide researchers working at their desktops a simple way to access and dynamically analyse NCI's vast amounts of geospatial data at scale.

The range of applications for this new capability is huge: GSKY is capable of working with a range of different data collections and file formats hosted at NCI as well as other geospatial data repositories around the world. This includes decades of Landsat satellite imagery, daily images and measurements from the constellation of European Sentinel satellites, and hundreds of different earth and environment models.

All the data can be overlaid, compared and played back over time. It can also be piped directly into analysis software. Most significantly, GSKY works in the background to subset large data files into only the portions researchers need, allowing them to easily access all the relevant data for their area of interest.

GSKY is supporting Geoscience Australia's ongoing Digital Earth Australia (DEA) project (See Case Study on page 36) by delivering high-performance access to Landsat data products generated on NCI by DEA. GSKY is also a major underpinning service for the Data61-developed TerriaJS software used by the "National Map" online data mapping system, which is particularly used by Geoscience Australia, CSIRO and other government environment agencies.

NCI's computational science expertise enables us to write this kind of big data software and leverage our integrated high-performance data and computing capabilities. Because our petabytes of highly managed geospatial data are connected directly to thousands of computer processors within NCI, we are able to take that data management task away from researchers and let them focus on the complex analysis they specialise in. Analysis of the Australian environment has never been easier.

Leadership and
Engagements

3

National and International Collaborations
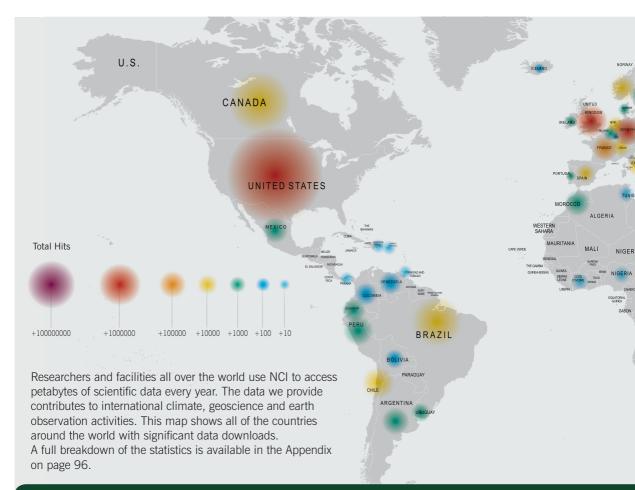
NCI maintains close relationships with computational science and high-performance computing organisations around the world. Developing hardware and software solutions to new science problems involves collaborating with a variety of renowned international bodies. Some of the key organisations we work with include NASA, the UK Meteorological Office and the European Space Agency, as well as companies such as Fujitsu and Lenovo. In 2018, NCI has engaged with the Advanced Data Analytics and Computing (ADAC) consortium, which includes a number of the world's leading supercomputing centres and vendors in the United States, Japan and Europe. Regular workshops facilitate collaboration and exchange

of expertise in areas impacting on all of the centres.

Collaboration is especially important when it comes to managing and improving our data collections. Acquisition and distribution of the latest satellite data, climate models and weather observations requires international cooperation. NCI participates in these global networks and actively contributes to the development of the data collections and the underlying data management processes, an important role on the global research stage.

These collaborative efforts make NCI a key location for researchers wanting to access some of the most valuable and scientifically important datasets, such as global climate modelling and

Researchers and facilities all over the world use NCI to access petabytes of scientific data every year. The data we provide contributes to international climate, geoscience and earth observation activities. This map shows all of the countries around the world with significant data downloads.
A full breakdown of the statistics is available in the Appendix on page 96.
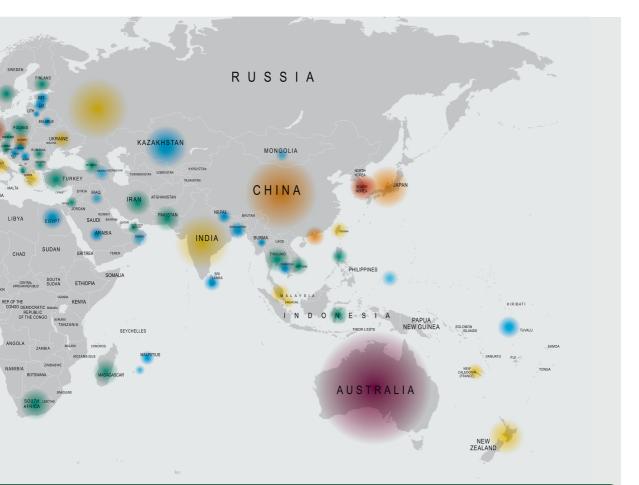
high-resolution satellite imagery. International and national traffic to NCI's data portals shows the level of interest that our data collections are generating.

Over the last 12 months, three times the number of users have downloaded 20 times more data than during the previous year. This year, the total downloaded data crossed the three-petabyte mark for the first time. Australian users account for 97% of all downloads, while researchers from over 137 different countries are now coming to NCI to access valuable datasets.

Our engagement with international partners provides a key service for Australian research by making new data, new tools and new hardware available to scientists. This keeps NCI users at the cutting edge of current and future developments in the supercomputing space.

Researchers from all over the country are benefiting from our engagement with all of our international partners. These include CSIRO and the ARC Centre of Excellence in Climate Extremes preparing for climate modelling using CMIP6 data (see Case Study on page 16), and Geoscience Australia further securing their valuable data using an upgraded tape library (see Case Study on page 27).

Similarly, our engagement with vendors for proof-of-concept testing around next-generation machines positions NCI as a leading centre for high-performance computing infrastructure and expertise. These close relationships lead to improved hardware performance, contributing directly to a better experience for researchers.
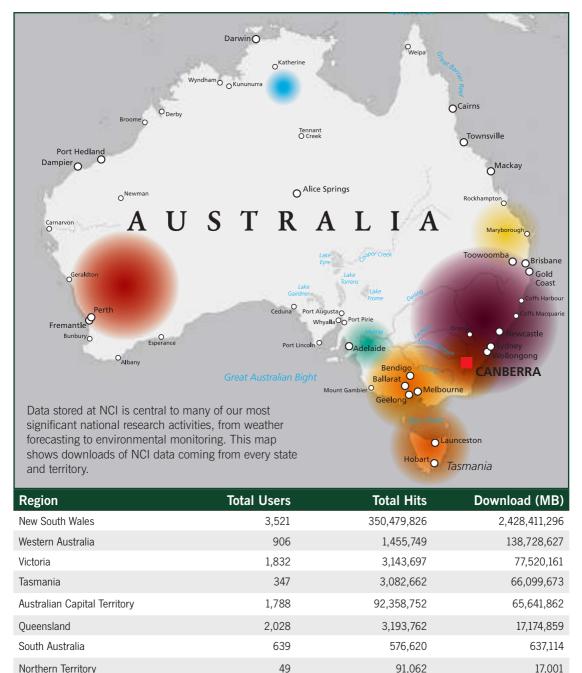
Our Users

Over 6,000 Australian researchers are using NCI to support their scientific projects, through access to high-performance computing and data resources, access to cutting-edge new technologies and tools, and newly developed data management and analysis portals.

Data stored at NCI is central to many of our most significant national research activities, from weather forecasting to environmental monitoring. This map shows downloads of NCI data coming from every state and territory.

Region	Total Users	Total Hits	Download (MB)
New South Wales	3,521	350,479,826	2,428,411,296
Western Australia	906	1,455,749	138,728,627
Victoria	1,832	3,143,697	77,520,161
Tasmania	347	3,082,662	66,099,673
Australian Capital Territory	1,788	92,358,752	65,641,862
Queensland	2,028	3,193,762	17,174,859
South Australia	639	576,620	637,114
Northern Territory	49	91,062	17,001
Grand Total	**11,110**	**454,382,130**	**2,794,230,593**

Our Partnerships

The NCI Collaboration

Supported by:

Partner Organisations:

Australian Research Council:

A node of:

Commercial Partners:

Commercial Collaborators:

Affiliates:

Our Vendors

FUJITSU

Lenovo.

XENON.
High Performance Computing

DELL

Hewlett Packard
Enterprise

IBM

CRAY

DDN STORAGE

NetApp

SPECTRA
SpectraLogic.com

intel

NVIDIA

Mellanox
TECHNOLOGIES

APC
by Schneider Electric

Altair

aarnet
Australia's Academic
and Research Network

Outreach

4

As a leader in the advanced computing and big data community in Australia, NCI provides more than just cutting-edge systems and services. We also conduct a large amount of outreach and engagement with our community and scientific audiences every year. Our outreach helps us play a part in the global computational science community, as well as the Australian political and social landscape.

You can see a full list of all major Outreach activities for 2017–18 on page 100.

Educational Outreach

From high-school students to scientists in training, NCI regularly welcomes groups keen to learn about the facility and everything that our high-performance computing and data facilities enable. For many students coming through our doors, this is their first look behind the scenes of the biggest scientific discoveries. We aim to foster an interest in the benefits and opportunities that supercomputing will provide them in the future. In January 2018, we welcomed over 160 students from the National Youth Science Forum, the National Mathematics Summer School and the College of Engineering and Computer Science Summer School to NCI.

Corporate Outreach

We attended numerous high-profile science events in 2017–2018, including the annual Science Meets Parliament event where NCI Director Sean Smith met with then-Prime Minister Malcolm Turnbull. These events are an opportunity to introduce supercomputing to important stakeholders, and develop relationships with potential collaborators, ministers, science leaders and industry representatives.

Students visiting the ANU College of Engineering and Computer Science came to NCI to learn about supercomputing and computational science.

NCI Director Professor Sean Smith met with Prime Minister Malcolm Turnbull at this year's annual Science meets Parliament event.

We hosted visits from several local politicians this year, including Assistant Minister for Science Senator Zed Seselja, and ACT MLA Rachel Stephen-Smith.

Training

In 2017–2018, NCI ran training sessions and workshops across Australia, with the aim of giving more researchers the skills they need to make best use of the supercomputing and data resources available to them. The HPC

Spring and Autumn Sessions – two week-long training sessions – brought more than 90 users together to learn all about basic and advanced supercomputing methods. Other training courses held on the campuses of various partner universities helped to make sure that as many users as possible had access to the latest

NCI and the Pawsey Supercomputing Centre had a joint booth in the SuperComputing 17 conference in Denver, Colorado.

information about using NCI's services. These sessions are an important way of developing the skill set of NCI's users and keeping them up to date with the latest technologies available to them.

National and International Engagements

As a global leader in high-performance computing and data, NCI is part of many international working groups, networks and collaborations. NCI staff play important roles in organisations that include the Earth System Grid Federation and the American Geophysical Union. Being involved in these key bodies gives NCI the opportunity to contribute to the global development of data management standards and international data sharing activities.

Operational and Strategic Planning Engagements

In 2018, NCI has undertaken an update to our operational and strategic planning engagements with our client communities. This started early in the year as part of the preparation for the release of a Request for Tender around the supercomputer replacement. This included consultation around the key desirable performance and operational parameters for the new peak HPC facility, during which NCI consulted with its expert NCMAS panel (the National Computational Merit Allocation Scheme panel) and with its government scientific agency partners.

Three strategic committees that will provide important feedback for NCI management from

The HPC Spring Session was one of many training courses we ran over the year to equip our users with skills to access and make best use of all the supercomputing and big data capabilities on hand.

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its client communities are being instituted, engaging respectively with its major partners: the HPC/HPD operations stakeholders and the key HPC/HPD research stakeholders.

Publications and Presentations

NCI is an active participant in many of the world's biggest open data and supercomputing conferences and journals. Over the course of 2017–2018, NCI staff presented talks at more than 30 conferences and published multiple peer-reviewed scientific papers. Highlights included the publication of a paper in the prestigious journal *Nature Chemistry,* and a keynote presentation at the European PRACE Days HPC Conference.

Students from the National Youth Science Forum visit NCI every year and get a close-up look behind the scenes of the supercomputer.

Governance

5

The NCI Board

NCI is governed by The Australian National University on the advice of the NCI Board, which comprises:

- an independent Chair appointed by the Board

- the Director, NCI

- one member appointed by each of the Major Collaborators (ANU, CSIRO, BoM and GA)

- additional independent board members appointed for two-year terms by the NCI Board on the basis of their expertise.

The Board is advised by:

- the Nominations Committee

- the Finance, Audit, Risk and Management Committee.

Board Members
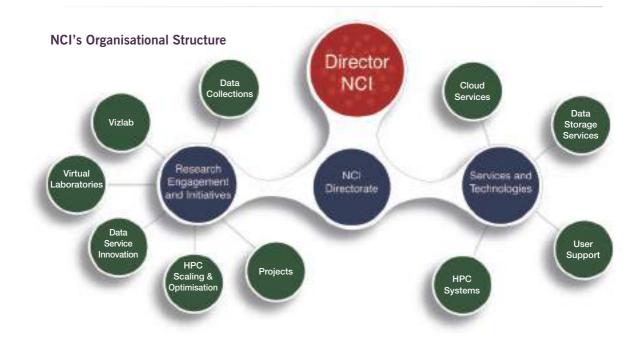
Dr David Williams
Executive Director, National Facilities and Collections, CSIRO

Emeritus Professor Robin Stanton
Independent Member and Deputy Chair

Dr Carina Kemp
Geoscience Australia (representing Dr James Johnson, Geoscience Australia, Chief Executive Officer)

Professor Sean Smith
NCI Director

Dr Sue Barrell
Bureau of Meteorology, Chief Scientist and Group Executive (Science and Innovation)

NCI's Organisational Structure

Professor Margaret Harding

The Australian National University, Deputy Vice-Chancellor (Research and Innovation)

Emeritus Professor Michael Barber

Board Chair

Dr Simone Richter

Australian Nuclear Science and Technology Organisation, Group Executive (Nuclear Science & Technology and Landmark Infrastructure)

Dr Thomas Barlow

Independent Member and Research Strategist, Barlow Advisory

Financial Report

Preamble

NCI is an organisational unit of The Australian National University. The ANU, as represented by NCI administers numerous funding contracts that support the operations of NCI. In the interests of providing a comprehensive picture of the NCI operation, a financial report consolidating these funding contracts is presented.

Each funding contract is accounted for in a distinct account within the University ledger, and the University facilitates, and where appropriate acts on, the NCI Board's directions and resolutions on NCI matters insofar as they are consistent with the relevant funding contract and not contrary to University Statutes and policies.

NCI Collaboration Income

The NCI Collaboration Agreement enables many of Australia's leading research intensive universities and science agencies to collectively fund a capability beyond the capacity of any single institution. Together, these institutions (including ANU, CSIRO, BoM, Geoscience Australia, the ARC, and a range of other research intensive universities and consortia) fund a significant proportion of NCI's operating costs. A small, but growing proportion of NCI Collaboration income comes from the commercial sector.

NCI also administers a number of grants and contracts outside of the NCI Collaboration accounts. These special purpose arrangements, fund clearly defined projects, infrastructure and services that provide synergistic benefits to the NCI Collaboration.

Following an announcement on 15 May 2018 by the Australian Government to support capital and operating requirements of Australia's National research infrastructure (NRI) facilities, NCI received $69.2 million from the Australian Government's NCRIS Program for the replacement of NCI's end of life supercomputer, Raijin, which is reflected in 'Grant income'.

Expenses

NCI, as Australia's national research computing service, provides world-class, high-end services to Australia's researchers. In order to do this, NCI invests significant amounts of money in its expert team of staff and high performance computing infrastructure. To maintain service quality NCI has, where possible, invested in extending the useful life of its existing infrastructure through the renewal of maintenance contracts. With funding now secured to replace NCI's Raijin supercomputer, major capital expenditure will occur in the coming year, following the procurement process for this new asset. NCI will continue to work to secure funding for replacement of other critical assets approaching end of life, including significant parts of NCI's storage infrastructure.

Review/Audit

Each funding contract held by the ANU as represented by NCI has specific financial reporting and auditing requirements, and NCI in conjunction with the University's Finance and Business Services Division and Corporate Governance and Risk Office acquit individual project funds in accordance with these requirements.

This consolidated statement has been reviewed by ANU's Finance and Business Services Division. The Chief Financial Officer certifies that:

The statement accurately summarises the financial records of these grants and that these records have been properly maintained so as to accurately record the Income and Expenditure of these grants.

STATEMENT OF INCOME AND EXPENDITURE

For the period 01 July 2017 to 30 June 2018

For the NCI collaboration and associated project accounts

	2017/18 $
Balance as at 1 July 2017	**18,280,617**
Add	
NCI Collaboration Income	10,172,243
Other grant income	78,575,225
Total Income	**88,747,467**
Total Available Funds Before Expenditure	**107,028,084**
Less	
Salaries & Related Costs	7,245,718
Equipment - Capital	3,020,984
Equipment - Non-Capital	84,673
Utilities & Maintenance	8,854,262
Travel, Field & Survey Expenses	390,091
Expendable Research Materials	2,465
Consultancies	126,723
Consumables	733,616
Internal Purchases	11,662
Other Expenses	233,397
Transfers to other	5,000
Total Expenditure	**20,708,591**
Unspent Balance as at 30 June 2018	**86,319,493**

Appendix

6

Infrastructure

Data

- 8 petabytes scratch filesystem storage on the supercomputer accessed at 150 GB/sec
- 50 petabytes active Lustre filesystem project storage accessed at up to 140 GB/sec
- 50 petabytes archived data accessed at up to 140 MB/sec
- 15,000 hard drives
- 5 global Lustre filesystems accessible by the HPC and cloud systems

HPC

- Hybrid Fujitsu Primergy/Lenovo NeXtScale cluster
- 1.67 petaflops peak performance
- 84,656 Intel Xeon Cores (2.6 GHz Sandy Bridge, Broadwell, Xeon Phi)
- 4,457 compute nodes
- 128 NVIDIA Tesla GPUs (P100, K80)
- Hybrid FDR-EDR Mellanox Infiniband non-blocking fat-tree interconnect (up to 100 Gb/sec)
- 300 terabytes of memory
- 8 petabytes of operational disk storage
- Over 740 million core hours per year
- 310 software packages

Cloud

- 75 teraflop peak performance Dell OpenStack cloud
- 3,200 Intel Xeon cores (2.6 GHz Sandy Bridge)
- 200 nodes
- Mellanox Ethernet full fat-tree interconnect (56Gb/sec)
- 50 terabytes main memory
- 320 terabytes of disk storage

Usage

Scientific projects supported by NCI in 2017–2018

Thousands of scientists every year use NCI to perform their research. They can access the computational resources through either the National Computational Merit Allocation Scheme (NCMAS) or one of our Partner Schemes. Compute allocations are measured in thousands of Service Units (kSU). A Service Unit is equivalent to the work done by one compute core in one hour.

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Daohua Bi, CSIRO	47606	0	ACCESS - AOGCM
Dr Amanda Barnard, CSIRO	43235	0	Properties and Stability of Nanoparticles for Advanced Applications
Dr Peter Steinle, Bureau of Meteorology	41500	0	Strategic Radar Enhancement Project
Dr Michael Naughton, Bureau of Meteorology	27000	0	BoM ESM research at NCI
Dr Terry O'Kane, CSIRO	20482	0	The AUStralian community ocean model ReAnalysis project (AURA)
Dr Andrew Hogg, Australian National University	16980	0	The Dynamics of the Southern Ocean
Prof Martin Asplund, Australian National University	16250	5500	3D magneto-hydrodynamical stellar modelling and 3D non-equilibrium radiative transfer
A/Prof Ben Corry, Australian National University	14300	800	Simulation studies of biological and synthetic channels
Prof Derek Leinweber, University of Adelaide	12303	3250	Electromagnetic Structure of Matter
Dr Christoph Federrath, Australian National University	12175	1500	Modelling clouds with MHD waves, turbulence, binary star formation, and AGN feedback in galaxy formation
Prof Matthew England, University of NSW	12107	7680	Past, present and future climate variability and change in the Southern Hemisphere
Dr Deborah Abbs, CSIRO	12089	0	Regional-Scale Seasonal Prediction Over Eastern Australia and the Coral Sea
Prof Jill Gready, Australian National University	12000	0	Simulation and Phylogenetics to decipher Rubisco structure, function and evolution
Dr Andrew Hogg, Australian National University	11960	0	Extratropical Variability
Dr Robin Wedd, Bureau of Meteorology	10600	0	ACCESS-Seasonal
Prof Evatt Hawkes, University of NSW	10087	1250	Direct Numerical Simulations of Turbulent Combustion
Prof Geoffrey Bicknell, Australian National University	9624	1374	Astrophysical Jets and Winds and their Interactions with the Ambient Medium
Prof Dietmar Mueller, University of Sydney	8687	2600	Geodynamics and evolution of sedimentary systems
Dr Gary Brassington, Bureau of Meteorology	7950	0	BLUElink3 - Bureau
Dr Angus Gray-Weale, Bureau of Meteorology	7800	0	Data assimilation for seasonal prediction
Prof Catherine Stampfl, University of Sydney	7064	2660	First-Principles Investigations of Processes and Properties in Catalysis, Coatings, and Devices
Prof Toby Allen, Royal Melbourne Institute of Technology	7005	475	Mechanisms of ion channel function and modulation.
Dr Aurel Moise, Bureau of Meteorology	6900	0	Climate Change Science and Processes

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Emeritus Professor Ross Griffiths, Australian National University	6600	0	The role of convection and turbulence in ocean circulation
Dr Megan O'Mara, Australian National University	6550	1500	Investigating biomolecular self-assembly, dynamics and substrate recognition
Prof Sean Li, University of NSW	6055	540	Investigating electronic properties of novel oxide materials for spintronic and energy applications
Dr Justin Freeman, Bureau of Meteorology	5850	0	Ensemble Ocean Forecasting
Mr Griffith Young, Bureau of Meteorology	5600	0	Seasonal Prediction Systems and Science
Prof Evatt Hawkes, University of NSW	5459	0	Direct Numerical Simulations of Turbulent Combustion
Prof Mark Krumholz, Australian National University	5075	1650	Star Formation and Feedback in a Turbulent Interstellar Medium
Prof Sean Smith, Australian National University	5011	2250	Computational Nanomaterials Science and Engineering
Dr Rhodri Davies, Australian National University	4950	950	From Plume Source to Hotspot
Prof Mike Ford, University of Technology, Sydney	4661	0	Designing and Building Novel 2D Hybrid Materials
Prof Alan Mark, University of Queensland	4550	2125	From molecules to cells Understanding the structural and dynamic properties of cellular components at an atomic level.
Dr Manolo Per, CSIRO	4234	0	Development and Application of Quantum Monte Carlo methods
Dr Emlyn Jones, CSIRO	4211	0	Coastal Ocean Data Assimilation
A/Prof Katrin Meissner, University of NSW	4185	1200	Abrupt climate change events in the past, present and future
Prof Malcolm Sambridge, Australian National University	4110	860	Computational Earth Imaging
A/Prof Chris Power, University of Western Australia	4000	0	GADGET3 Porting, Scalability and Production Computing on Raijin
A/Prof Nikhil Medhekar, Monash University	4000	0	CoE FLEET
Prof Michelle Coote, Australian National University	3900	0	Computer-aided Chemical Design of Catalysts and Control Agents
A/Prof Michelle Spencer, Royal Melbourne Institute of Technology	3870	1000	Theoretical Investigation of novel materials for industrial and biomedical applications
Prof Jingming Duan, Geoscience Australia	3800	0	Magnetotelluric and Electrical data inversion
Mr Wenjun Wu, Geoscience Australia	3750	0	AGDC Operations and code repositories (Public and private)
Prof Salvy Russo, Royal Melbourne Institute of Technology	3700	0	CoE Exciton Science
Dr Andrew Hogg, Australian National University	3600	3600	The Dynamics of the Southern Ocean
Dr Vincent Wheatley, University of Queensland	3483	1499	Scramjet-based Access-to-Space and Planetary Entry
Prof Brian Smith, La Trobe University	3190	0	Biomolecular modelling
Mr Asger Gronnow, University of Sydney	3176	0	The effect of the Galactic halo magnetic field on gas condensation and accretion
Dr Marcus Thatcher, CSIRO	3136	0	High-resolution Downscaled Climate Runs
NCI Fujitsu Collaboration	3100	0	NCI-Fujitsu ACCESS Model Optimisation
NCI Internal (System, Training, Development)	3065	0	NCI Internal Projects

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
A/Prof Ekaterina Pas, Monash University	3058	1425	Development and Application of Quantum Chemistry Methods for the prediction of physicochemical properties of condensed systems
Dr Claudio Cazorla, University of NSW	2954	0	Rational design of novel multiferroic materials for energy harvesting and energy efficiency
Dr Ivo Seitenzahl, UNSW Canberra	2868	0	Hydrodynamical explosion simulations and radiative transfer for thermonuclear and core-collapse supernovae
Prof Clive McAlpine, University of Queensland	2866	1250	The capacity of forests to protect regional climate under global warming: science and policy implications
Dr Harvey Ye, Bureau of Meteorology	2800	0	Weather and Environmental Prediction Specialised Forecasting Systems (WEPSFS)
Prof Christoph Arns, University of NSW	2797	450	Integration of conventional and digital core analysis
Prof Carola Vinuesa, Australian National University	2725	0	Computational identification of medically-relevant, personal genetic variation from the largest volumes of human genome sequences.
Dr Warren Kaplan, Garvan Institute of Medical Research	2640	0	Garvan - KCCG MGRB
Dr Ravichandar Babarao, CSIRO	2589	0	CO2 conversion in catalytic MOFs
Dr Adrian Pudsey, Royal Melbourne Institute of Technology	2525	125	Aerothermodynamics of Hypersonic Flight and Enabling Technologies
Prof Suresh Bhatia, University of Queensland	2524	1250	Interfacial Barriers for the Transport of Nanoconfined Fluids
PhD,BMath/BSc(Honsl) Alister Page, University of Newcastle	2505	0	Quantum Chemical Simulation of Interfacial Chemical Phenomena
Prof Michelle Coote, Australian National University	2500	2500	Computer-aided Chemical Design of Catalysts and Control Agents
Prof Michael Ferry, University of NSW	2481	0	bulk metallic glasses
Prof Debra Bernhardt, University of Queensland	2444	1050	New materials and fluids for catalysis, battery technologies and sensors.
Mr Leon Majewski, Bureau of Meteorology	2400	0	Remotely sensed observations for Earth system modelling
Dr Pradeep Bhattad, Australian Commercial Organisation	2400	0	Commercial work on Analysis of Sedimentary Rock Material
A/Prof Ben Thornber, University of Sydney	2271	0	Mix in high-acceleration implosions driven by multiple shocks
Prof Salvy Russo, Royal Melbourne Institute of Technology	2250	0	ARC Centre of Excellence in Exciton Science
Dr Judy Hart, University of NSW	2122	249	Design and development of new photocatalytic materials for efficient hydrogen production and biomedical applications
Dr Adrian Sheppard, Australian National University	2100	0	Understanding petrophysical and multiphase flow properties of rock through experiment, 3D imaging and modelling
Dr Benjamin Galton-Fenzi, Australian Antarctic Division	2091	0	Research, development and production computing for Antarctic Climate & Ecosystems CRC under the ACE-CRC/AGP/AAD-NCI partnership
A/Prof Serdar Kuyucak, University of Sydney	2080	0	Molecular Dynamics Simulations of Ion Channels and Transporters
Prof Leo Radom, University of Sydney	2052	1600	Structural and Mechanistic Chemistry
Dr Trevor Allen, Geoscience Australia	2050	0	EQRM
Dr Martin Jucker, University of NSW	2025	0	Atmospheric and oceanic processes and dynamics

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Prof Allen Rodrigo, Australian National University	2000	0	Evolutionary analyses using short-read sequences from pooled samples of anonymous, genetically-variable individuals.
Prof Justin Borevitz, Australian National University	1950	0	Linking Genotype, Phenotype and Landscape to improve Plant Energy
Dr Patrick Burr, University of NSW	1946	259	Energy materials modelling
Prof Julio Soria, Monash University	1924	1000	Investigations of transitional and turbulent shear flows using direct numerical simulations and large eddy simulations
Dr Abhnil Prasad, University of NSW	1923	0	The effects of tropical convection on Australia's climate
Dr Seojeong Lee, University of NSW	1888	0	Joint Labour Supply and Retirement of Australian Couples
Dr Timothy Trudgian, UNSW Canberra	1862	0	Verifying the Riemann hypothesis to a new record height
Prof Catherine Stampfl, University of Sydney	1860	0	First-Principles Investigations of Processes and Properties in Catalysis, Coatings, and Devices
A/Prof Zhe Liu, University of Melbourne	1854	1425	Integrated Computational Materials Engineering for Alloy Design
Prof Hugh Blackburn, Monash University	1806	1140	High-Order Methods for Transitional and Turbulent Flows
A/Prof Chris Power, University of Western Australia	1750	1750	Tests of Dark Matter and Galaxy Formation in Next-Generation Galaxy Surveys
Prof Aijun Du, Queensland University of Technology	1750	1525	Nanomaterials for Energy, Nanoelectronics and Environmental Applications: Contribution from Modelling towards Rational Design
Prof Steven Sherwood, University of NSW	1726	1450	Rethinking atmospheric physics to resolve climate enigmas
Prof Russell Boyce, UNSW Canberra	1723	950	Physics of the interactions between high-speed craft and their environment
Dr Cheong Xin Chan, University of Queensland	1687	850	Comparative Analysis of Completely Sequenced Genomes of Diverse Environments
Dr XUEFEI Liu, University of NSW	1681	0	Optimisation of membrane module and separation processes in water/wastewater treatment process using numerical simulation approaches
Dr Benjamin Galton-Fenzi, Australian Antarctic Division	1653	0	Research, development and production computing for the Antarctic Gateway Project under the ACE-CRC/AGP/AAD-NCI partnership
Dr Ming Zhao, University of Western Sydney	1650	0	Investigation of fluid-structure interaction in offshore engineering using computational fluid dynamics
Dr Reza Mahjoub, University of NSW	1642	0	Interface control of ferroelectricity in ferroelectric superlattices
Dr Matthew Chamberlain, CSIRO	1636	0	ACCSP Dynamical Ocean Downscaling of Climate Change Projections
Dr Michael Rezny, Monash University	1634	0	Terrestrial modelling within the Centre of Excellence regionalizing land surface processes
Prof Thomas Huber, Australian National University	1630	380	protein structure calculation and design using limited experimental data
Dr Dietmar Dommenget, Monash University	1620	0	Global scale decadal climate variability in a ACCESS hierarchy of climate models
A/Prof Nikhil Medhekar, Monash University	1558	1000	Atomistic Simulations for Electronic, Chemical amd Mechanical Properties of Nanoscale Materials
Prof Alexander Heger, Monash University	1538	974	Exploring the Diversity of Core-Collapse Supernova Explosions
A/Prof Jason Evans, University of NSW	1526	0	Precipitation-groundwater interactions over eastern Australia climate change impacts at multiple scales

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Terry Frankcombe, Australian National University	1514	0	Efficient chemical dynamics in gas phase, solid phase and heterogeneous systems
A/Prof Jared Cole, Royal Melbourne Institute of Technology	1500	380	The materials science of transport and decoherence in quantum devices.
Mr Laurence Davies, Geoscience Australia	1500	0	Tomography Data Processing
A/Prof Jason Evans, University of NSW	1489	0	Heatwaves
Prof Mark Thompson, Monash University	1480	950	Transition, stability and control of bluff body flows
Dr Haibo Yu, University of Wollongong	1480	705	Molecular Simulations of Enzymatic Catalysis and Computer Aided Molecular Design
Prof Kevin Walsh, University of Melbourne	1450	1450	South Pacific High-resolution Climate Model Simulations
Dr Peter Daivis, Royal Melbourne Institute of Technology	1440	0	Molecular Rheology of Freely Jointed Chain Model Polymer Melts
Prof Nathan Bindoff, University of Tasmania	1420	900	Turbulence and mixing in the Southern Ocean
Dr Robyn Schofield, University of Melbourne	1410	1410	Atmosphere-Ocean Coupled Chemistry Climate Modelling of Ozone and Aerosols
Dr Matthew Perugini, La Trobe University	1395	0	Molecular Dynamics of Protein Targets Linked to Infectious, Diabetic and Age-Related Diseases
A/Prof Rob Womersley, University of NSW	1365	0	Computation and optimization of energy, packing, covering and worst case error for point configurations on manifolds
Dr Benjamin Galton-Fenzi, Australian Antarctic Division	1300	1300	Modelling of the interaction between Antarctica and the Southern Ocean
Mr Adam Phipps, Victor Chang Cardiac Research Institute	1280	0	VC Dunwoodie
A/Prof Jason Sharples, University of NSW	1280	710	Modelling and simulation of dynamic bushfire propagation
Dr. Hamid Valipour, University of NSW	1275	0	Atomistic Simulations of Materials in Various Environmental Conditions
A/Prof Xiao Hua Wang, UNSW Canberra	1275	0	Oceanic Nepheloid Layers and Their Role in Coastal Oceanography
A/Prof Gregory Sheard, Monash University	1234	760	Seeking the ultimate regimes of heat transport in horizontally driven natural convection
Dr Andrew Neely, UNSW Canberra	1202	74	Fluid-thermal-structural interactions for high-speed flight and propulsion
Dr Amir Karton, University of Western Australia	1200	1200	High-level quantum chemistry: From theory to thermochemical and biochemical application
Dr Oliver Hofmann, University of Melbourne	1200	0	VCCC Pilot Project
Prof Shin-Ho Chung, Australian National University	1200	0	Action of Toxins from Venomous Animals on Biological Ion Channels Molecular Dynamics Studies
Dr Junming Ho, University of NSW	1188	375	Accelerating the Design of Novel Catalysts and Drugs through Computational Chemistry
Dr Catia Domingues, University of Tasmania	1178	1178	Ocean heat uptake processes: implications for global and regional sea level change in the ACCESS model
Prof Simon Ringer, University of Sydney	1170	0	Exploring structure-property correlations in advanced materials: Nexus between computational simulation and atomic resolution microscopy
Prof Hans De Sterck, Monash University	1168	749	Advanced simulation methods for the coupled solar interior and atmosphere
Dr Jong-Leng Liow, UNSW Canberra	1128	0	Study of xanthan gum behaviour through computational fluid dynamics and molecular simulation

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Benjamin Galton-Fenzi, Australian Antarctic Division	1118	0	Research, development and production computing for the Australian Antarctic Division under the ACE-CRC/AGP/AAD-NCI partnership
Dr Nicole Kessissoglou, University of NSW	1069	0	Aeroacoustic analysis of a finite wall-mounted airfoil
Mr John Wilford, Geoscience Australia	1060	0	Data mining and geostatistical modelling for geoscience applications
Prof Simon Easteal, Australian National University	1050	125	The National Centre for Indigenous Genomics
Prof Marc Parlange, Monash University	1042	675	Large-Eddy Simulation of Canopy Flows in Complex Terrain
Prof Kerry Hourigan, Monash University	1026	561	Advanced Modelling of Fluid-Structure Interactions
Emeritus Professor Ross Griffiths, Australian National University	1000	1000	The role of convection and turbulent mixing in ocean circulation
Prof Tiffany Walsh, Deakin University	1000	1000	Development and application of bio/nano interfacial simulations
Dr Daniel Chung, University of Melbourne	1000	1000	Direct numerical simulation of wall-bounded and buoyancy-driven turbulent flows
Dr Shayne McGregor, Monash University	1000	699	Predicting and understanding Australia's regional rainfall distribution in a changing climate
Dr Aaron Ludlow, University of Western Australia	1000	0	Constraining Galaxy Formation with Bayesian Statistics
Prof Susan Clark, Garvan Institute of Medical Research	1000	1000	Cancer Epigenome Computational Analysis
A/Prof Michelle Spencer, Royal Melbourne Institute of Technology	980	380	Modelling Nanoscale Materials for Sensing and Device Applications
A/Prof Jason Evans, University of NSW	978	950	Regional Climate Modelling in South-east Australia
Prof Orsola De Marco, Macquarie University	965	115	Common envelope interaction and stellar outbursts in the era of time-domain Astrophysics
Mr Adam Phipps, Victor Chang Cardiac Research Institute	960	0	VC Structural Biology
A/Prof Serdar Kuyucak, University of Sydney	959	225	Free Energy Simulations of Ion Channels and Transporters
Prof Aibing Yu, Monash University	928	325	Simulation and Modelling of Particulate Systems
Prof Elizabeth Ritchie-Tyo, UNSW Canberra	916	249	WRF Testing for Tropical Cyclone Studies
Prof Richard Yang, University of Western Sydney	912	0	Multiscale modelling of Advanced Engineering Materials and Structures
Prof Peter Betts, Monash University	912	565	Subduction from top to toe.
Dr Junming Ho, University of NSW	907	0	Accelerating the Design of Novel Catalysts and Drugs through Computational Chemistry
Dr Diego Molla-Aliod, Macquarie University	900	0	Deep learning experiments for text summarisation
Mr Andrew Driscoll, DHI	900	0	DHI-019
Mr Nick Horspool, Geoscience Australia	900	0	Severe Wind and Coastal Inundation Modelling
Dr Hongtao Zhu, University of Wollongong	877	249	Crystal plasticity FEM simulation of severe plastic deformation techniques
Dr Nicolas Flament, University of Wollongong	840	600	The geodynamics of past sea level changes
Dr Cullan Howlett, University of Western Australia	815	0	SONGS - Simulations Of Non-standard Gravity for Surveys
A/Prof Craig O'Neill, Macquarie University	800	0	dfss
Mr Patrick Sunter, Bureau of Meteorology	800	0	Extended Hydrological Prediction modelling

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Prof Tiffany Walsh, Deakin University	800	0	Molecular simulation of carbon fibre composites
Mr Adam Phipps, Victor Chang Cardiac Research Institute	800	0	VC Martinac
Dr Dan Taranu, Western Australia Research Institution	790	0	UWA Modelling and simulating the evolution of spiral galaxies
Dr Elizabeth Krenske, University of Queensland	781	249	Theoretical Modelling of Molecular Structure and Reactivity
Dr David Huang, University of Adelaide	767	362	Multi-scale modelling of soft condensed matter in functional materials
Dr Chenghua Sun, Swinburne University of Technology	760	760	Computer-Aided Materials Design for Clean Energy
Prof Richard Sandberg, University of Melbourne	749	749	High-fidelity simulations of turbomachinery applications
Emeritus Professor Michael Crisp, Australian National University	700	0	Evolution of Australiaâ€™s globally unique hotspot of floral diversity: phylogenomic analysis of Myrtaceae
A/Prof John Young, UNSW Canberra	697	200	Fluid-Structure Interactions in Biological and Biomedical Systems
Prof Benjamin Powell, University of Queensland	695	374	Computational approaches to organic photonic and electronic materials: from strongly electronics to device engineering
Prof Marcela Bilek, University of Sydney	683	124	Harnessing the bioactivity of protein fragements and peptides
Dr Yun Wang, Griffith University	682	332	Mechanistic Investigations of high-performance electrocatalysts for water splitting under operational conditions
Prof Kiet Tieu, University of Wollongong	676	0	Quantum mechanics and molecular dynamics investigation of tribochemical reactions alkali polyphosphate lubricants and steel surfaces
Dr Ting Liao, Queensland University of Technology	670	570	Theoretical Design of Oxides Based Materials for Energy Application
Dr Yan Jiao, University of Adelaide	669	249	Computational electrochemistry study of solar-fuel generation
Dr Edward Obbard, University of NSW	666	0	Atomic scale modelling of nano-solute-vacancy clusters in reactor pressure vessel steel
Dr Luming Shen, University of Sydney	657	249	Modelling high strain rate responses of unsaturated porous media
Mr Michael Whimpey, Bureau of Meteorology	650	0	Radar Science and Nowcasting
Miss Luz Garcia, Swinburne University of Technology	640	0	Diagnosing Hydrogen Reionization with metal absorption line ratios.
Dr Mirela Tulbure, University of NSW	631	125	Multi-sensor integration for spatiotemporal quantification of trends in surface water extent dynamics with implications for water policy in a water scarce region
Prof Ian Dance, University of NSW	629	50	Computational Bio-inorganic and Supramolecular Chemistry
Mr Rodrigo Canas, University of Western Australia	620	0	Intra-Halo Stellar Mass in Simulations
A/Prof Michael Kirkpatrick, University of Sydney	620	0	Surface driven mixing of thermally stratified riverine flows
Prof Robert Stranger, Australian National University	620	0	DFT and TD-DFT Studies of Organometallic and Metal Cluster Systems
Prof Mike Ford, University of Technology, Sydney	610	360	Nanostructured Materials for Energy Efficiency Applications

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Manodeep Sinha, Swinburne University of Technology	602	0	Simulating the Connection between Galaxy Growth, the Inter-Galactic Medium and Reionization
Prof Mark Johnson, Macquarie University	600	0	Deep Learning for Natural Language Processing
A/Prof Todd Lane, University of Melbourne	600	600	High resolution simulation of storms, clouds, and atmospheric turbulence, with applications to rainfall variability, planetary-scale feedbacks and aviation
Research Fellow Rob Sok, Australian National University	600	0	Lithicon production processing
Dr Mohammednoor Altarawneh, Murdoch University	588	588	Fundamental Understanding of the Role of Singlet Molecular Oxygen in Spontaneous fires
Dr Anh Pham, University of NSW	577	0	Theoretical study of 2D and 3D topological materials
Dr Simon McClusky, Geodynamics, Australian National University	575	250	Environmental Geodesy and Geodynamics
Prof Robert Stranger, Chemistry, Faculty of Science, Australian National University	575	575	Computational Studies of the Mn/Ca Cluster in Photosystem II
Prof Craig Moritz, Australian National University	575	0	Inferring phylogeny and explaining diversity using genome-scale data: methods and applications
Research Scientist Jing Huang, CSIRO	572	0	Hi-res mapping of renewable energy from meteorological records for Australia
Prof Graham Heinson, University of Adelaide	571	175	3D Geophysical Imaging for the Australian Lithospheric Architecture Magnetotelluric Project (AusLAMP)
Dr Adrian Sheppard, Australian National University	570	570	Computational Mesoscale Physics, Probing Complex and Hierarchical Material Structure
Dr Timothy Trudgian, UNSW Canberra	570	250	Verifying the Riemann hypothesis to a new record height
Dr John Pye, Australian National University	568	0	Modelling of high-temperature concentrating solar thermal energy systems
Prof Albert Van Dijk, Australian National University	564	264	The next generation of environmental remote sensing, data assimilation and forecasting systems
Prof Andrew Greentree, Royal Melbourne Institute of Technology	555	0	Atom-photon interactions in biologically relevant media
Prof Peter Rayner, University of Melbourne	554	554	Assimilation of Trace Atmospheric Constituents for Climate
Dr Judy Hart, University of NSW	551	0	Surface structures and catalytic properties of oxide semiconductors
Dr David Gunawan, University of NSW	550	0	Efficient Bayesian Inference for Intractable Likelihood Problems
Mr Wenjun Wu, Geoscience Australia	550	0	AGDC Development and Science (GA internal)
Dr David Lescinsky, Geoscience Australia	550	0	GA-NCI development collaboration space
Dr Lars Goerigk, University of Melbourne	547	547	Theoretical and Computational Quantum Chemistry Including Development of Computational Methods and Computational Materials Science
Dr Michael Breedon, CSIRO	543	0	The adsorption of molecules onto surfaces found in energy storage devices
Dr Nicholas Williamson, University of Sydney	540	0	Stratified boundary layers in riverine environments: Modification of flow stability by lateral circulation
Mr Adam Phipps, Victor Chang Cardiac Research Institute	520	0	VC Suter
Mr Rhys Poulton, University of Western Australia	515	0	Studying the orbits and interactions of satellite galaxies in the next generation of surveys and simulations
Prof Salvy Russo, Royal Melbourne Institute of Technology	514	0	Quantum Modelling of Photo-Electrode Materials

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Thomas Plantard, University of Wollongong	512	0	Security Analysis of Lattice-based Cryptosystems
Dr Susanna Guatelli, University of Wollongong	509	0	Development of new physics models in Geant4 for nanomedicine applications in the fight against cancer
Dr Gregory Wilson, CSIRO	503	0	Electronic Structure of Organic/Inorganic Dyes for Photovoltaic Applications
Prof Derek Leinweber, University of Adelaide	501	0	Electromagnetic Structure of Matter - e31 Ancillary Project
Prof Maria Forsyth, Deakin University	500	40	Computational investigation of new selective transport materials
Prof Julian Gale, Curtin University of Technology	500	500	Atomistic Simulation for Geochemistry and Nanoscience
Dr David Burbidge, Geoscience Australia	500	0	Geohazard Modelling for the Asia-Pacific Region
Prof Gavin Huttley, Australian National University	500	0	Statistical modelling of genetic variation
Director of Endocrin Nikolai Petrovsky, Flinders University	498	74	Molecular modelling for design of more effective vaccine adjuvants
Prof Anthony Papenfuss, Peter MacCallum Cancer Centre	498	124	Towards a Better Understanding of the Evolution of Drug Resistance in Tumours Using Detailed Predictive Computational Models
Prof Con Doolan, University of NSW	489	0	Aeroacoustics of low and high Mach number flows
Dr Warren Kaplan, Garvan Institute of Medical Research	480	0	Garvan Genome Pilot
Prof Andrew Ooi, University of Melbourne	480	480	Computational Fluid Dynamics Studies of Pulsatile Flows in Pipes and Arteries
Dr Justin Leontini, Swinburne University of Technology	475	475	Oscillatory flows in complex geometries
Dr Lawrence Cavedon, Royal Melbourne Institute of Technology	475	0	Deep Learning for Complex Labeling Tasks
Dr Meredith Jordan, University of Sydney	470	332	Molecular Interactions
Dr Chantal Donnelly, Bureau of Meteorology	450	0	Water Information Services
Dr Daniel King, University of NSW	450	0	Investigation of High Entropy Alloys for use in advanced nuclear applications
Mr James Goodwin, Geoscience Australia	450	0	Geophysics
Dr Dave Stegman, Overseas University	449	374	4-D Numerical Models of Plate Tectonics Subduction with an Upper Plate
Dr Alessandra Malaroda, University of Wollongong	436	0	Personalised dosimetry for molecular radiation therapy
Prof Joseph Lai, UNSW Canberra	436	195	Disc Brake Squeal
A/Prof Tracie Barber, University of NSW	434	0	CFDMECH
Dr Anthony George, University of Technology, Sydney	431	0	Role of dominant motions in the catalytic mechanism of cathepsin L protease.
Dr Alberto Peruzzo, Royal Melbourne Institute of Technology	430	0	RMIT Node, ARC Centre of Excellence for Quantum Computation and Communication Technology
Prof Geraint Lewis, University of Sydney	427	0	SSimPL-ACS The Survey Simulation PipeLine - Alternative Cosmologies Study
Dr Charlotte Welker, University of Western Australia	425	0	Playing on the E-STRINGS: the dwarf regime
Prof Jill Gready, Australian National University	424	424	Simulation of Enzyme Mechanisms, and Protein Dynamics, Structures and Properties

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Leonard Hamey, Macquarie University	420	0	Analysis of prostate MRI
A/Prof Lexing Xie, Australian National University	412	0	The Anatomy of Social Media Popularity
Dr Alejandro Di Luca, University of NSW	411	250	The future intensity of extreme East Coast Lows
Dr Christian Wolf, Australian National University	405	0	SkyMapper and the Southern Sky Survey
Dr Roger Amos, NCI staff	400	0	Area 3 Computational Chemistry GPU study
Dr Simon Mortensen, DHI	400	0	DHI-012 Provision Unlimited
Dr Louis Moresi, University of Melbourne	400	400	Instabilities in the convecting mantle and lithosphere
Dr Simon Mortensen, DHI	400	0	DHI-023
Dr Fabio Zambetta, Royal Melbourne Institute of Technology	400	0	Intrinsic Reward Schemes to Accelerate Learning in Sparse Reward Environments
Dr Sylvain Foret, Australian National University	400	0	Coral genomics, transcriptomics and epigenomics
Prof Ravi Jagadeeshan, Monash University	395	125	Sticky polymers in flow: Nexus between microscopic and macroscopic dynamics
Dr Susanna Guatelli, University of Wollongong	391	0	Monte Carlo based studies to improve radiotherapy treatment and associated Quality Assurance Instrumentation in the fight against cancer
Prof Lei Wang, University of Wollongong	387	0	Exploring National Treasure: Automatic Photo Search for the Large Collection of National Archives of Australia
Prof Leo Radom, University of Sydney	380	0	Structural and Mechanistic Chemistry
Prof Igor Bray, Curtin University of Technology	375	375	Atomic Collision Theory
Dr Iwan Jensen, Flinders University	375	375	Exact Enumerations in Statistical Mechanics and Combinatorics
Prof Lloyd Hollenberg, University of Melbourne	375	375	Multi-Million Atom Quantum Computer Device Simulations
Dr Jingxian Yu, University of Adelaide	371	175	Peptronics: Understanding the Relationship between Structures and Properties
Dr Fabio Luciani, University of NSW	370	50	Systems immunology at the single-cell level
A/Prof Jason Evans, University of NSW	368	0	Will East coast lows change in frequency or intensity in the future?
Dr Alister Page, University of Newcastle	366	366	Quantum Chemical Modelling of Nanoscale Chemical Processes
Dr Martin Singh, Monash University	354	249	Understanding tropical circulations using idealised and comprehensive models
Prof David Thomas, Garvan Institute of Medical Research	350	0	A whole genome study to map heritable risk in sarcoma
Mr Ian Harman, CSIRO	348	0	Constructing a Coupled Economic-Climate System Model
Dr Andrew Hung, Royal Melbourne Institute of Technology	345	125	Developing New Treatments for Pain
Dr Claudio Cazorla, University of NSW	340	338	Nano-structured multifunctional materials for solid-state cooling
Dr Anthony Murphy, CSIRO	335	0	Modelling of the Plasma Production of Nanostructures
Dr Kai Qin, Royal Melbourne Institute of Technology	330	0	Collaborative Learning and Optimisation
A/Prof Valentijn Pauwels, Monash University	328	200	Bias removal in data assimilation systems for flood forecasting

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Matthew Garthwaite, Geoscience Australia	325	0	InSAR research to measure surface deformation of the Australian continent
Dr David Wilson, La Trobe University	325	0	Computational Study of Novel Molecular Properties
Dr Marlies Hankel, University of Queensland	325	0	Nanoporous membranes for energy applications
Dr Chunguang Tang, University of Sydney	324	124	Materials Design for Self-toughening Bulk Metallic Glasses
Prof LiangChi Zhang, University of NSW	323	100	An integral approach for the defect-free fabrication of high-integrity systems
Prof David Edwards, University of Western Australia	323	323	Analysis of complex genomes
Dr Xingyong Wang, University of Wollongong	313	150	Computational study on the molecular mechanisms of UV-induced DNA photodamage and photolyase-catalysed DNA photorepair
Dr Warren Kaplan, Garvan Institute of Medical Research	310	0	Garvan - KCCG Research
Dr Joseph Horvat, University of Wollongong	310	249	Blue shift of terahertz absorption lines for molecular crystals
Dr Asaph Widmer-Cooper, University of Sydney	305	300	Interactions and self-assembly of colloidal nanoparticles: Establishing design rules for creating new nano-structured materials
Dr Thomas Poulet, University of NSW	303	150	Multiphyisics geological simulations using MOOSE
Prof Salvy Russo, Royal Melbourne Institute of Technology	302	299	Prediction of the Properties of Materials and Nanomaterials
Dr Peter Jones, University of Technology, Sydney	300	0	Allosteric Control of ATP Hydrolysis in the ABC Transporter Catalytic Cycle.
Dr Alejandro Montoya, University of Sydney	300	0	Molecular Modelling of Reactive Materials
A/Prof Craig O'Neill, Macquarie University	300	300	Tracking mantle slab dewatering using ASPECT
Dr Mark Holzer, University of NSW	300	300	Decadal Changes in Southern Ocean Ventilation
Mr Andrew Driscoll, DHI	300	0	DHI-022
Prof Ian Dance, University of NSW	300	0	Computational Bio-inorganic and Supramolecular Chemistry
Prof Kefei Zhang, Royal Melbourne Institute of Technology	290	0	HPC-based data assimilation to forecast ionosphere and thermosphere
Dr Thi Ta, University of Wollongong	288	0	Molecular Dynamics Simulation of Aqueous Triblock Copolymer Lubricants in Metal Forming Applications
Prof Yuantong Gu, Queensland University of Technology	284	124	Molecular dynamics simulations of protein folding in solution and at surfaces/interfaces
Dr Leonard Hamey, Macquarie University	280	0	Affect Recognition from Video
Dr Anil Kumar Gorle, Griffith University	280	0	Binding of antiangiogenic platinum with glycasaminoglycans(GAGs): A study of structure and dynamics of Platinum bound GAG fragments
Prof Susan Clark, Garvan Institute of Medical Research	275	225	Creating and Mapping Personal Epigenomes
Prof Malin Premaratne, Monash University	273	135	Computational framework for an Ab-initio Computer Model of an ultrafast SPASER
Prof Klaus Regenauer-lieb, University of NSW	271	0	Tyree X-Ray Facility
A/Prof Peter Strazdins, Australian National University	270	0	Parallel Systems Course COMP4300

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Rey Chin, University of Adelaide	267	125	Numerical simulations of rough wall turbulence: A control's approach
Dr Martin Bell, University of Sydney	265	0	Transients and Variables with the MWA
Dr Jay Larson, Australian National University	260	0	Unified Model porting
Prof Buyung Kosasih, University of Wollongong	255	0	Fluid dynamic phenomena affecting the liquid coating quality in the jet stripping line
Mr Wenju Cai, CSIRO	252	0	Climate Change Impact on Southeast Queensland Water Supply
A/Prof Adam Trevitt, University of Wollongong	251	74	Computational Investigation of the Chemistry of Reactive Intermediates
Dr Narjes Gorjizadeh, University of NSW	251	0	First-principle study of reaction between complex carbon-bearing materials and metallic phase towards a novel approach for recycling waste polymers for sustainable environment
Dr Xiaodong Li, Royal Melbourne Institute of Technology	250	0	Solving real-world large scale black-box optimization problems
Dr Jason Monty, University of Melbourne	250	0	LES of high Reynolds number turbulent wall bounded flows
Mr Simon Oliver, Geoscience Australia	250	0	Copernicus Australia Regional Data Hub - Sentinel Archive
Dr Brendan Kennedy, University of Western Australia	250	0	Discovering criteria for blood element differentiation using rigorous simulation
Dr Marcus Doherty, Australian National University	250	0	First principles innovation of solid-state quantum technologies
Prof Andrew Blakers, Australian National University	250	0	Satisfying 90% of the electricity need in the National Electricity Market with wind, photovoltaics and off-river pumped storage
Prof Brian Yates, University of Tasmania	249	249	Designing Better Catalysts
Prof Allan Canty, University of Tasmania	249	249	Catalysis and Organometallic Chemistry
Dr David Gwyther, Antarctic Gateway Project	249	249	Assessing ice shelf-ocean interaction through intercomparison and validation
A/Prof Marcel Cardillo, Australian National University	249	124	Understanding patterns of evolutionary and ecological diversification
Dr Timothy Trudgian, UNSW Canberra	241	0	Oscillations, zero-free regions, and the Riemann zeta-function
Dr Xiao Liang, University of Sydney	240	0	Elucidate the fundamental chemistry of biomass hydrothermal liquefaction
Dr Kasper Kaergaard, DHI	240	0	DHI-017
Dr Flora Salim, Royal Melbourne Institute of Technology	240	0	Multivariate time-series prediction of electricity consumption
Mr Richard Miller, Macquarie University	240	0	Piloting Environment. Faculty of Science and Engineering, Macquarie University
A/Prof Cheng Lu, University of Wollongong	237	0	Deformation mechanism of 'gradient' materials
Dr Merlinde Kay, University of NSW	236	0	Australian Solar Resource Assessment and Forecasting System (ASRAFS) - advanced toolbox options for AREMI
Dr David Chalmers, Monash University	233	124	The dynamics of drug behaviour in the human body
Dr Felicity Graham, University of Tasmania	228	167	Improving model simulations of ice sheet dynamic processes that contribute to sea level rise
Dr Callum Atkinson, Monash University	226	125	Extending numerical simulation of turbulent flows via assimilation with experimental data

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Prof Chennupati Jagadish, Australian National University	225	0	Nanostructured optoelectronic devices: new materials and applications
Dr Yi Du, University of Wollongong	224	0	Fundamental understanding of water splitting on TiO2 surface
Prof Jingming Duan, Geoscience Australia	220	0	GA Workshop
A/Prof Steven Siems, Monash University	218	50	Simulations of wintertime storms across Southeast Australia, Tasmania and the Southern Ocean
Dr Liangzhi Kou, Queensland University of Technology	218	0	Two-dimensional Layered van der Waals (vdWs) Heterostructures for Photovoltaic Application
Dr Linqing Pei, University of Wollongong	215	0	Molecular dynamics simulation of fracture behaviour in nanocrystalline fcc structures
Prof Stephen Bartlett, University of Sydney	211	0	Quantum error correction simulation
Prof Peter Harrowell, University of Sydney	210	175	Soft Modes, Amorphous Defects and the Mechanical Properties of Metallic Glasses
Dr Ryan Armstrong, University of NSW	207	0	MUTRIS: Unconventional Rescources
A/Prof Aaron Oakley, University of Wollongong	206	156	Dynamics of DNA clamps on DNA
Prof Ivan Cole, Royal Melbourne Institute of Technology	203	0	Study on the airflow phenomena on the respiratory system
A/Prof Timothy Garoni, Monash University	202	50	Design, analysis and application of Monte Carlo methods in statistical mechanics
Prof Shin-Ho Chung, Australian National University	200	200	Computational Studies of Poplypeptide Toxins from Venomous Animals Targeting Cationic Membrane Channels
Dr Luke Barnes, University of Sydney	200	0	Lyman Alpha and stellar emission from high redshift galaxies
A/Prof Ben Thornber, University of Sydney	200	0	Detached Eddy Simulation of a Generic Road Vehicle
Dr Jiabao Yi, University of NSW	200	200	Mechanism of ferromagnetism in oxide and 2D based diluted magnetic semiconductors (DMSs)
Mr Simon Oliver, Geoscience Australia	200	0	Copernicus Partners Testing and Development
A/Prof Michael Kirkpatrick, University of Sydney	200	0	Surface driven mixing of thermally stratified riverine flows
Prof Thomas Welberry, Australian National University	200	0	Computation of X-Ray Diffraction Patterns for 3D Model Systems
Dr Gareth Vio, University of Sydney	200	0	Fluid-Structure Interaction using higher Order CFD
Dr Mohsen Talei, University of Melbourne	200	0	University of Melbourne Combustion Pilot Project
Dr Fabio Zambetta, Royal Melbourne Institute of Technology	200	0	Apprenticeship Learning to mimic Players Behaviour in an Interactive Narrative
Dr Stephen Gould, Australian National University	200	0	Machine Learning for Computer and Robotic Vision
Prof Brendan McKay, Australian National University	200	0	Extremal graph theory and Ramsey theory
Prof Duong Do, University of Queensland	200	0	Novel Characterization of Porous Structure and Surface Chemistry of Carbon by means of Monte Carlo computer simulation
Mr Neil Symington, Geoscience Australia	200	0	High-performance Computational Groundwater Science
Dr David Wilson, La Trobe University	199	199	Quantum Chemical Molecular Properties
Dr Yi Du, University of Wollongong	199	0	Simulation on atomic and electronic structures of 2D materials
Dr Fangbao Tian, University of NSW	198	0	Fluid-structure Interactions and Complex Flows in Biological and Biomedical Systems

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Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Ailie Gallant, Monash University	192	124	Mesoscale modelling of urban landscapes for assessing heat adaptation and mitigation strategies with climate change
A/Prof Balazs Csaba, Monash University	192	0	Dark Matter Discovery
Dr Leo Lymburner, Geoscience Australia	190	0	AGDC Experimental (External)
Mr Shuai Li, University of Wollongong	190	0	Automated recognition of daily activities
Research Scientist Peter Oke, CSIRO	189	0	Bluelink developments
Dr Sang Lee, University of New England	183	0	Whole-genome approaches for dissecting (shared) genetic architecture of complex traits
Dr Xiaoke YI, University of Sydney	182	124	Integrated photonic simulation based on COMSOL
Prof Steven Armfield, University of Sydney	182	0	Direct simulation of transition for natural convection flow in inclined differentially heated cavities
Mr Alan Green, University of Wollongong	182	0	Driving increased utilisation of cool roofs on large footprint buildings
Dr Tim Gould, Griffith University	180	125	A roadmap for the inclusion of dispersion forces in structural prediction
Prof Gregory Metha, University of Adelaide	177	0	Metal Nanoclusters as Catalysts for Photoreduction of CO_2
Prof Qing-Hua Qin, Australian National University	175	0	Topology Optimisation of Mechanical Metamaterials and Multifunctional Materials
Dr Roger Amos, NCI	175	0	Ab initio calculations for large systems
Prof Tom Gedeon, Australian National University	175	0	Deep learning from psychophysiological data
Prof Anthony Weiss, University of Sydney	171	0	Temperature-Dependent Dimerisation of Tropoelastin
A/Prof Rongkun Zheng, University of Sydney	170	0	Low dimensional magnetism and supercondcutivity
Prof Yi-Ping Phoebe Chen, La Trobe University	170	0	LTU0014 - Bioinfomatics Management for Genome Data
Dr Alan Blair, University of NSW	164	50	Spiking Networks and Deep Learning for Speech, Language, Images and Games
Dr Wei Wen, University of NSW	162	0	Joint Analysis of Imaging and Genomic Data to Study the Structure and Function of Human Brain
Dr Sammy Diasinos, Macquarie University	160	0	Automotive Aerodynamics
Mr Adam Phipps, Victor Chang Cardiac Research Institute	160	0	VC HO
Ms Tracy Bailey, Other Australian Government Department	160	0	ARPANSA Pilot Project
Dr Leonard Hamey, Macquarie University	160	0	Data Analytics for Malware Using Machine Learning
Dr Leonard Hamey, Macquarie University	160	0	Medical Image Analysis for Dementia Diagnosis
Dr Yi Qin, CSIRO	159	0	Atmosphere remote sensing with new generation satellites
Dr Feng Chen, University of NSW	156	0	Point processes and their applications
Prof Christoph Arns, University of NSW	155	0	Multi-scale multi-physics analysis of porous media
A/Prof Moninya Roughan, University of NSW	151	0	Advancing dynamical understanding in the East Australian Current Optimising the ocean observation and prediction effort
Dr Warren Kaplan, Garvan Institute of Medical Research	150	0	Garvan - KCCG GenPhen

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Neha Gandhi, Queensland University of Technology	150	0	Molecular dynamics simulations of protein folding in solution and at surfaces/interfaces
Dr Maely Gauthier, Garvan Institute of Medical Research	150	0	The role of the non-coding DNA and the oral microbiome in oral cavity squamous cell carcinoma
Dr Daniel Rosauer, Australian National University	150	0	Why are biodiversity hotspots found where they are?
Dr Petra Heil, University of Tasmania	150	150	Tracking changes in Antarctic sea-ice motion
Ms Caroline Lai, DHI	150	0	DHI-018
Mr Timothy Womersley, DHI	150	0	DHI-020
Mr Andre Minoche, Garvan Institute of Medical Research	149	149	Resolve complex clinical relevant structural variation and haplotypesÂ using novel linked short reads
Prof Evgeny Morozov, UNSW Canberra	149	0	Structural Performance Analysis of Damaged Composite Structures
Dr Boris Beranger, University of NSW	148	0	Spatial Extremes
Prof Guan Yeoh, University of NSW	145	0	Multiphysics simulations for interdisciplinary engineering applications
Dr Drew Parsons, Murdoch University	145	50	Subtle quantum mechanical forces of ions and structures.
Prof William Foley, Australian National University	145	0	Whole genome analysis of Eucalyptus - Australia's foundation tree
Dr Alan Blair, University of NSW	141	125	Hierarchical Deep Reinforcement Learning
Dr Edward King, CSIRO	141	0	National Remote Sensing Processing Facility
Mr Masoud Abdi, Deakin University	140	0	Deep learning for Image Classification
Dr Craig Harrison, Geoscience Australia	140	0	Least-squares adjustment of the national geodetic network
Mr Richard Miller, Macquarie University	140	0	Novel Microwave Antennas and EM Structures
Dr Mehrtash Harandi, Australian National University	138	0	Large-Scale Visual Recognition Using Riemannian Geometry
Dr Jenny Fisher, University of Wollongong	136	50	The use of state-of-the-art 3-D chemical transport modelling to unravel the effects of atmospheric chemistry on climate
Prof Terry Bossomaier, Charles Sturt University	135	0	Information flow in Vicsek Models
Dr Julian Berengut, University of NSW	132	0	Electronic spectra of superheavy elements and highly-charged ions
Prof Kefei Zhang, Royal Melbourne Institute of Technology	130	0	RMIT SPACE
Dr Stephen Gibson, Australian National University	130	0	Vibronic coupling in the ground state of vinylidene
Dr Cullan Howlett, University of Western Australia	126	0	SONGS - Simulations of Non-standard Gravity for Surveys
Research Fellow Pascal Elahi, University of Western Australia	126	0	Building Synthetic UniveRses for Surveys
Dr Charlotte Welker, University of Western Australia	126	0	Playing on the E-STRINGS: Effects of STReam INfall on Galactic Structure
Dr Marta Yebra, Australian National University	125	0	The Flammability Monitoring System
Prof Emanuele Viterbo, Monash University	125	125	Performance Simulations for 5G Communication Systems
Mr Wei Liu, Griffith University	125	0	Force calculation of POSCARs for phonon calculation of real and postulated Zr3Fe and LaNi5 hydrides
A/Prof Balazs Csaba, Monash University	125	125	Analysing Beyond the Standard Model physics with NCI computing time

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Prof Gleb Beliakov, Deakin University	125	50	Large scale high accuracy computations for studies of Riemann's zeta function, as part of the 8th Hilbert problem
Dr Mark Baird, CSIRO	125	0	eReefs Marine Modelling GBR1
Prof Zhengyi Jiang, University of Wollongong	125	0	Control Strategies of Surface Quality of Stainless Steels
Prof Anthony Weiss, University of Sydney	125	125	Hierarchical Assembly of Elastin Fibres
Dr Mohsen Talei, University of Melbourne	125	125	Prediction of noise and pollutant emissions by premixed flames
Dr Jatin Kala, Murdoch University	125	125	Can land surface radiation management reduce the intensity of heat waves?
Dr Joachim Mai, University of NSW	125	0	Intersect commercial 01
Dr Simon Illingworth, University of Melbourne	125	125	Reduced-order models of wall-bounded turbulence
Mr Daniel Duke, Monash University	125	125	Simulating turbulent multiphase flows in pressurised metered-dose inhalers
Dr Francisco Gomez Carrasco, Royal Melbourne Institute of Technology	125	125	Data-driven methods for turbulent flow control
Dr Elena Pasternak, University of Western Australia	125	125	Energy dissipation and wave propagation in fragmented materials under dynamic loading
Prof Liang Cheng, University of Western Australia	125	125	On the prediction of extreme fluid loading and fluid-structure-seabed interaction
Dr Elena Pasternak, University of Western Australia	124	124	Wave propagation in fragmented materials
Dr Tiannan Guo, Other Australian Research Institute	124	124	Optimisation of an open-source SWATH-MS pipeline for The ACRF International Centre for the Proteome of Human Cancer
Dr Lenneke Jong, Australian Antarctic Division	124	124	Coupled Ice-Ocean modelling using FISOC to investigate the effect of ocean induced basal melt rates on marine ice sheets.
Dr Todd Silvester, Other Australian Government Department	124	0	High Dynamic Pressure Separation of Hypersonic Vehicles
Dr Kazuya Kusahara, University of Tasmania	124	124	Modelling the intimate links between sea ice, landfast ice, water mass formation and ice shelf melt around East Antarctica
Dr James Bull, University of Melbourne	124	124	Molecular photoswitching: Combining ion mobility mass spectrometry and computational chemistry
Dr Leonardo Hardtke, University of Technology, Sydney	120	0	Himawari-8 EVI development in support of TERN Phenology product and forecasting.
A/Prof Melih Ozlen, Royal Melbourne Institute of Technology	120	0	Fuel treatment planning maintaining habitat availability and connectivity for endangered species conservation
Dr Kei-Wai Kevin Cheung, Macquarie University	120	0	Studies on High-impact Weather, Climate Variability and Systems Dynamics
Prof Margaret Lech, Royal Melbourne Institute of Technology	120	0	Deep Emotional Intelligence
Dr Warren Kaplan, Garvan Institute of Medical Research	120	0	Garvan - Human Comparative and Prostate Cancer Genomics - Vanessa Hayes
Dr David Henry, Murdoch University	120	50	Nanoscale materials and Nanoscale Interactions - From Catalysts through to Hydrophobic Soils
Prof Peter Karuso, Macquarie University	120	0	understanding fluorescence using DFT and ab initio methods
Dr Judy Hart, University of NSW	118	0	DFT study of doping effects in Tetragonal Zirconia Polycrystalline (TZP)

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Prof Jeffrey Reimers, University of Technology, Sydney	116	0	Modelling of Chemical Systems Including Molecular Excited States, Photosynthesis, and Molecular Electronics Applications
Dr Ming Feng, CSIRO	116	0	CSHOR Coupled dynamics of the warm pool
Dr Vanessa Haverd, CSIRO	115	0	The Australian Continental Carbon Budget
Dr Duncan Sutherland, UNSW Canberra	111	0	Physics based simulations of wild fire behaviour
Dr Bernhard Mueller, Monash University	110	0	Core Collapse Supernovae and Radionuclides in the Solar System
Mrs Sarah Chapman, University of Queensland	110	0	The effect of climate change and urban growth on the urban heat island in Australian Cities
Dr Edoardo Tescari, University of Melbourne	110	0	UMEL Properties of feedback during galaxy formation and evolution
Dr Jorg Schluter, Deakin University	110	0	Computational Fluid Dynamics
Dr Alexander Swarbrick, Garvan Institute of Medical Research	110	50	Molecular characterisation of metastatic breast cancers
Dr Francisco Trujillo, University of NSW	110	0	Radio frequency electric fields (RFEF) processing modelling
Prof Michael Reeder, Monash University	110	0	The dynamics of subtropical anticyclones and the connection to drought, heatwaves and bushfires in southern Australia
Dr Jason Wong, University of NSW	109	0	Annotation of non-coding mutations in whole cancer genomes
A/Prof Socrates Dokos, University of NSW	109	0	Multiphysics biventricular model of the heart
Dr Aaron McDonough, Vendor Guest Accounts	108	0	General Share for User Code Development and Testing
Dr Jeremy Davis, University of Wollongong	107	0	Characterisation of Radiation detectors using finite element and Monte Carlo computational techniques
Dr Thomas Balle, University of Sydney	107	0	Computational modeling of allosteric binding sites in nicotinic acetylcholine receptors
Dr Rose Andrew, University of New England	105	0	Woodland Eucalyptus Genomics
Dr Eva Cheng, Royal Melbourne Institute of Technology	105	0	Investigation of the mechanism of wind-induced acoustic noise
A/Prof Peter Strazdins, Australian National University	105	0	Performance Analysis and Optimization of Large-scale Scientific Simulations
Dr Lawrence Lee, University of NSW	104	0	Artificial synthesis of multi-subunit protein machines using synthetic DNA templates
Prof Anatoli Kheifets, Australian National University	103	0	Theory of multiple atomic ionization
A/Prof Deanna D'Alessandro, University of Sydney	102	50	Towards Conducting Nanoporous Framework Materials
Dr Jiabao Yi, University of NSW	101	0	Diluted magnetic semiconductor based on 2D materials
Dr Sebastian Oberst, University of Technology, Sydney	101	0	Evidenced-based modelling of thin-film lubrication in total hip arthroplasty
A/Prof Peter Strazdins, Australian National University	100	0	Computer Science Undergraduate Course
Mr Siqi Liu, University of Sydney	100	0	Automatic 3D Neuron Reconstruction from Microscopic Images
Dr Tianfang Wang, University of the Sunshine Coast	100	50	Bioinformatics, molecular dynamic simulation of biofunctional proteins and mass spectrometric fragmentation mechanisms

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Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Liqi Han, University of Queensland	100	0	Parallel QuasiMC - a High Performance Light Simulator for Virtual Agriculture
Dr Kailing Shen, Australian National University	100	0	Startup for using Raijin
Prof Dougal McCulloch, Royal Melbourne Institute of Technology	100	0	Electronic structure of boron nitride and other novel coating systems
A/Prof Nicolas Cherbuin, Australian National University	100	0	Brain structure, cognition, and ageing a magnetic resonance imaging investigation
Dr Qi Shao, University of Queensland	100	0	Large-scale 3D geophysical data inversion using finite element method based software esys-escript
Dr Juan Felipe Torres Alvarez, Australian National University	100	0	Thermophoretic desalination under laminar and turbulent flows
Dr Serena Lee, Griffith University	100	0	Large-scale flexible mesh modelling (Australia, Pacific, Southern Ocean)
Dr Stephen Roberts, Australian National University	100	0	Investigation of techniques to improve the prediction of flood events
Dr Brendan Malone, University of Sydney	100	0	Multiscale Digital Soil Mapping
Dr Ian Cockburn, Australian National University	100	0	Analysis of single cell transcriptomes in the immune system
Prof Peter Gill, Australian National University	100	0	Development and application of new quantum chemistry algorithms
Dr Colin Jackson, Australian National University	100	0	Computational Structural Biology and Protein Engineering
Dr Seher Ata, University of NSW	97	0	Computational study of bubble coalescence of two capillary-held air bubbles using Volume of Fluid (VOF) method
A/Prof Wenyi Yan, Monash University	93	0	Optimization and structural analysis for additive manufacturing and maintenance
Dr Yuguo Yu, University of NSW	92	0	Stochastic analysis on the durability of cementitious materials considering the influence of material and environmental uncertainties
A/Prof Chris Ling, University of Sydney	92	0	A combined experimental and computational approach to understanding and developing solid-state ionic conductors
Dr Stephan Chalup, University of Newcastle	92	0	Deep learning for improved real world object detection using synthetic image data that has been rendered using computer graphics techniques
Dr Arif Khan, Charles Sturt University	92	0	GA Computation for VANETs
Dr Naomi Haworth, University of Sydney	91	0	How does insulin work?
Prof Emanuele Viterbo, Monash University	91	0	Waveform design for 5G wireless standard
Dr Michael Bowen, University of Sydney	90	0	Determining the location of novel binding sites for oxytocin
Dr Jed Burns, University of Queensland	90	0	Investigation of pathway bifurcations in organic reactions
Dr Michael Ireland, Australian National University	90	90	Discovering and dating nearby young stellar associations with orbital traceback
Prof Jian-Feng Nie, Monash University	90	0	Structures and stability of solute aggregate and segregation in advanced Mg alloys
Dr Omid Kavehei, University of Sydney	90	0	Seizure prediction using massively parallel feature extraction methods
Dr Edward Simpson, Australian National University	88	0	Nuclear Reaction Cross Sections for Hadron Therapy
Mr Alexander Bray, Australian National University	88	0	Application of an optimised TDSE solver to resolve the quantum tunnelling time discrepancy

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Dr Shahram Karami, Monash University	88	0	Direct numerical simulation of particle-laden flows in a coaxial-jet
Dr Robert Rees, CSIRO	88	0	Molecular simulations of biological systems.
Ms Mun Hua Tan, Deakin University	87	0	Fish/Invertebrate Genomics
Mr Daniel Duke, Monash University	86	0	HRMFoam scaling studies on Raijin
Dr Yu Lin, Australian National University	85	0	Large-Scale Genome Assembly and Analysis
Dr. Mark Baird, CSIRO	84	84	Improved estimates of water quality variables for Great Barrier Reef management using a data-assimilating implementation of the eReefs model.
Dr Joslin Moore, Monash University	83	0	New multi-scale seed dispersal models for improved regional weed management
Dr Benjamin Schwessinger, Australian National University	83	0	The Evolution of stripe rust virulence
Dr Suelynn Choy, Royal Melbourne Institute of Technology	82	0	Satellite Delivery of Augmented Positioning Data for PPP and PPP-RTK Services in Australia and New Zealand
Dr Megan McDonald, Australian National University	81	0	Resequencing fungal plant pathogen genomes with the Oxford Nanopore MinIon
Prof Heiko Timmers, University of NSW	81	0	Graphene Defects: Dynamics and Role of Interfaces
Mr Richard Miller, Macquarie University	80	0	Hyperspectral unmixing
Dr Robert Luke, Macquarie University	80	0	Binaural Listening
Dr Ross Brodie, Geoscience Australia	80	0	Airborne Electromagnetics (AEM) Inversion
Dr Johnathan Kool, Geoscience Australia	80	0	Marine Operations and Processing
Dr Tapio Simula, Monash University	80	80	Quantum Turbulence
Prof Bradley Carter, University of Southern Queensland	80	0	Space Weather in Exoplanetary Systems
Mr Richard Miller, Macquarie University	80	0	Machine Translation
Dr Michael Terkildsen, Bureau of Meteorology	80	0	Space weather modelling
Mr Rhydar Harris, DHI	80	0	DHI-021
Dr David Lescinsky, Geoscience Australia	80	0	Virtual Laboratories development environment
Dr Leonard Hamey, Macquarie University	80	0	Recognition of Signal Emitters
Dr Warren Kaplan, Garvan Institute of Medical Research	80	0	Garvan - Immmunogenomics - Chris Goodnow
Dr Cormac Purcell, Macquarie University	80	0	Earthly Astro-biology: Classifying Marine Animals in Aerial Video Footage
Dr Warren Kaplan, Garvan Institute of Medical Research	80	0	Garvan - RNA Biology and Plasticity - John Mattick
Dr Tao Zou, Australian National University	80	0	On the Statistical Inference for Large Precision Matrices with Dependent Data
Prof Jiankun Hu, University of NSW	76	0	Big Data Security
Mr Alexander Ratcliffe, Australian National University	75	0	Two Qubit Gates For Trapped Ion Systems
Dr Francis Hui, Australian National University	75	0	Resampling-based hypothesis testing on the FLC test
Prof Curt Wentrup, University of Queensland	75	0	Theoretical calculations on reactive molecules, intermediates and prebiotic chemistry pathways
Dr Deborah Apthorp, Australian National University	75	0	Using machine learning to track disease progression in Parkinson's disease

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Prof Jeffrey Reimers, University of Technology, Sydney	75	0	Application of quantum electronic-structure methods to protein crystallography and photosynthetic function
Dr Zhenchang Xing, Australian National University	75	0	UI Design to Code
Mr Barry Croke, Australian National University	75	0	Sensitivity analysis of environmental models
Mr Othmar Korn, University of Queensland	75	0	Stemformatics Pilot Project
Prof Timothy Baldwin, University of Melbourne	74	74	Deep Language Understanding
Dr Matthew Arnold, University of Technology, Sydney	74	0	Optimization of plasmonic nanoantennas and metamaterials
Dr Markus Hagenbuchner, University of Wollongong	73	0	Modelling active play in preschool children using machine learning
Dr Ashley Ruiter, UNSW Canberra	73	0	Testing binary star evolution models: thermonuclear supernova progenitors
Dr Steffen Bollmann, University of Queensland	72	0	Quantiative Susceptibility Mapping Inversion using Deep Learning
Dr Luigi Renzullo, CSIRO	70	0	Soil Moisture products
Prof Lin Padgham, Royal Melbourne Institute of Technology	70	0	Simulation experimentation
Dr Juntao Wang, University of Western Sydney	70	0	SparCC correlation for network analysis
Dr Warren Kaplan, Garvan Institute of Medical Research	70	0	Garvan-Deakin Collaboration Program in Advanced Genomic Investigation (PAGI)
A/Prof Matthew Hole, Australian National University	70	0	Computational Applications in Equilibrium and Instabilities of Advanced Plasma Confinement Geometries
Dr Lan Du, Monash University	69	0	Scalable Probabilistic Models for learning complex relational data with rich side information
Dr Christopher McAvaney, Deakin University	68	0	Systematic Paring Tube Design Tool To Enhance The Utility Of Centritherm
Dr Ben Hui, University of NSW	66	0	Model-based evaluation of STI testing strategy for remote IndigenousÂ population
Prof Sebastian Sardina, Royal Melbourne Institute of Technology	65	0	Plan De-Binding
Prof Susan Clark, Garvan Institute of Medical Research	65	0	Garvan - Epigenetics Research - Susan Clark
Miss Sara Hamouda, Australian National University	64	0	Supporting User-Level Fault Tolerance in Extreme Scale Runtime Systems
Prof Andreas Ernst, Monash University	64	0	Mine Planning Optimisation
Dr John Daniels, University of NSW	62	0	Modelling of electroceramic materials
Dr Kejun Dong, University of NSW	62	0	Particle-scale numerical study on screening processes (subproject from ARC Hub for Computational Particle Technology)
Prof Qing-Hua Qin, Australian National University	62	0	Piezoelectric bone remodeling analysis by finite element method
Prof Xiaojun Qiu, University of Technology, Sydney	61	0	Wind Noise Generation Mechanism Study
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Tumour Progression - Alex Swarbrick
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Lymphocyte Signalling And Activation - Elissa Deenick

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Cancer Biology - Chris Ormandy
Dr Nicholas White, Australian National University	60	0	Using MD to understand the supramolecular chemistry of anions
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Biodata Visualisation - Sean O'Donoghue
Dr Yun Shi, Griffith University	60	0	Molecular dynamics simulations of neuraminidase-inhibitor interactions
Dr Tony Vo, Monash University	60	0	From Saturn's hexagon to Earth's polar vortex; elucidating shear-layer instability in rotating flows
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Transcriptomic Research - Timothy Mercer
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Mucosal Autoimmunity - Cecile King
Dr Daniel Cocks, Australian National University	60	0	How antimatter and matter solvate in liquids
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Bone Biology - Peter Croucher
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan -Parkinson's Disease and Neurodegeneration - Antony Cooper
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Metaball - Mark Febbraio
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Burnett Bioinformatics - Leslie Burnett
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Ovarian Cancer Research - David Bowtell
Dr Johnathan Kool, Geoscience Australia	60	0	Geoscience Australia Bathymetry and Backscatter Processing
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Genome Informatics - Marcel Dinger
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - KCCG Prod
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Osteoporosis and Translational Research - John Eisman
Prof Iain Prentice, Macquarie University	60	0	Primary production in space and time
Mr Derrick Lin, Garvan Institute of Medical Research	60	0	Garvan - Garvan DICE - Derrick Lin
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Genome Pathology 2031 - Leslie Burnett
Dr Ross Brodie, Geoscience Australia	60	0	Potential Field Modelling in Spherical Coordinates
Dr Warren Kaplan, Garvan Institute of Medical Research	60	0	Garvan - Immunology and Immunodeficiency - Stuart Tangye
Dr Cedric Simenel, Australian National University	59	0	Microscopic and Macroscopic Studies for Nuclear Reactions
Dr Di Wu, University of NSW	58	0	Stochastic nonlinear analysis of topology composite structures
Dr Atsushi Sekimoto, Overseas University	58	0	Direct numerical simulations of Couette turbulence with adverse pressure gradient
Dr Zongyan Zhou, Monash University	56	0	Multiscale modellng of Flow and Heat Transfer in Particulate Systems
Dr Marat Sibaev, Australian National University	55	0	Highly accurate energy calculations for finite uniform electron gases

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Cenk Kocer, University of Sydney	55	0	The analysis of thermally tempered glass as a structural element in vacuum windows
Dr Marnie Shaw, Australian National University	55	0	Optimising the use of neural networks for forecasting electricity demand
Dr Tania Vodenitcharova, University of Sydney	55	0	Numerical modelling of cutting of soft materials
Dr David Cortie, University of Wollongong	55	0	Density functional theory for the next-generation of electronic materials
Dr Joachim Mai, University of NSW	55	0	Intersect Partnershare Management
Dr Dan Andrews, NCI/Australian National University	55	0	Identification of mouse genetic variation to investigate causes of sepsis
Dr Daniel Falster, University of NSW	54	0	Evolutionary assembly of forest communities
Prof Neshev Dragomir, Australian National University	54	0	Nonlinear and tunable dielectric metasurfaces
Dr Roger Proctor, University of Tasmania	53	0	New Flagship-E Project 2018: Australian National Shelf-seas Reanalysis: initial data and software services
Dr Martin Cope, CSIRO	52	0	Future Air Quality Projection
Mr Guillaume Jolly, Commercial organisations	51	0	Trampo CFD Pilot Project
Dr Michael Dennis, Australian National University	50	0	Computational fluid analysis of co-flowing trans-sonic jets
Prof Andrew Rohl, Curtin University of Technology	50	50	Realistic Modelling of the Effects of Solvent and Additives on Crystallisation
Dr David McGuinness, University of Tasmania	50	50	Production of Linear Alpha Olefins Mechanistic and Applied Investigations
Mr Johannes Pottas, Australian National University	50	0	Structural and thermal modelling of components in concentrating solar power systems
Dr Anna Herring, Australian National University	50	0	Connected pathway flow vs. ganglion dynamics: understanding pore-scale displacement mechanisms using multiphase lattice-Boltzmann models
Dr Shahab Joudaki, Swinburne University of Technology	50	0	Testing Gravity on Cosmic Scales with Weak Gravitational Lensing and Redshift Space Distortions
Dr Alison Kirkby, Geoscience Australia	50	0	Magnetotelluric inversions for AusLAMP
Prof Anthony Hill, Australian National University	50	0	DFT: in probing the uncharted areas of organometallic chemistry
Dr Marnie Shaw, Australian National University	50	0	Deep learning applied to MRI-based maps of the human cerebral cortex
A/Prof Nicholas Robins, Australian National University	50	0	Higher order interactions and lattice dynamics of Bose-Einstein condensates
Prof Stephen Hyde, Australian National University	50	0	Self-assembly of Polyphiles via Espresso Simulations
Dr Ross Brodie, Geoscience Australia	50	0	Potential Field Modelling in Cartesian Coordinates
Prof Saeid Nahavandi, Deakin University	50	0	A Deep Feature-based Medical Image Classification Framework
Mr Leighton Alcock, University of Wollongong	50	0	Metal complexes of expanded cavity cage ligands
Dr Scott Morrison, Australian National University	50	0	Subfactors and planar algebras
Mrs Chenoa Tremblay, Curtin University of Technology	50	0	Searching for Molecular Transitions with the MWA
Dr Anoop Cherian, Australian National University	50	0	Deep Learning for Human Activity Recognition Using Computer Vision

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Damian Moran, Macquarie University	50	0	Innovative Molecular Scaffolds by Design
Prof Albert Van Dijk, Australian National University	50	0	OzEWEX
Dr Vinuthaa Murthy, Charles Darwin University	50	0	Theoretical Investigations of Surface Reactions on Chromium Carbide and Mixed-Metal Carbides
Dr Feng Wang, Swinburne University of Technology	50	50	Computational studies of ferrocene and its derivatives
Prof Edith Sevick, Australian National University	50	0	Simulation of Block Copolymers which Incorporate Mechanical Bonds
Dr Ranjith Unnithan, University of Melbourne	50	0	Design and optimisation of far infrared multispectral sensors
Prof Andrew Blakers, Australian National University	50	0	Global atlas of off-river pumped hydro energy storage
Dr Nicholas Matzke, Australian National University	50	0	Massive parallel analysis: Reconstructing the role of distance and seed traits in the global history of flowering plant dispersal
Mr Johannes Pottas, School of Engineering, College of Engineering and Computer Science, Australian National University	50	0	Structural modelling of components in solar thermal energy systems
Dr Sambasivam Periyannan, Australian National University	50	0	Enhancing resistance to wheat stripe rust disease
Mr Timothy Womersley, DHI	50	0	DHI-024
Dr Tim Gould, Griffith University	50	50	Ab-initio calculation of high-temperature superconducting properties of palladium hydride
A/Prof Elena Ostrovskaya, Australian National University	50	0	Polariton Bose-Einstein Condensation in Optically-Induced and Microstructured Potentials
Dr Pierre Loos, Theoretical Quantum Chemistry, Australian National University	50	0	Spherical geometry in chemistry and physics
Dr Louise Olsen-Kettle, Swinburne University of Technology	50	25	Fractures and Earthquakes: modelling extreme events and instabilities
Dr Basura Fernando, Australian National University	50	0	Anticipating Human Activities in Real-time from Video Streams
Dr Dean Cutajar, University of Wollongong	50	0	Monte Carlo Optimisation of Detector Systems for HDR Brachytherapy Quality Assurance
Prof Bijan Samali, University of Western Sydney	49	0	Intersect adhoc proj 14
Dr Vidhyasaharan Sethu, University of NSW	49	0	NN training - Speech
Dr Andrew Gilbert, Australian National University	48	0	Chemistry Course Project
Dr Antonio Tricoli, Australian National University	48	0	Simulation of Nanoparticle Films Self-Assembly for Breath Analysis and Non-Invasive Medical Diagnosis
Dr Daniel Price, Monash University	47	0	What Regulates Star Formation?
Dr Xuesong Shen, University of NSW	46	0	Civil Deep Learning - Xuesong Shen
Dr Anastasios Polyzos, CSIRO	45	0	Calculation of Reaction Co-ordinate for New Catalytic C-H Activation
Prof Tony Vassallo, University of Sydney	45	0	Modelling the interactions and influences of organic compounds in zinc-bromine redox flow battery systems
Dr Alejandro Montoya, University of Sydney	45	0	Modelling of the Lithium Extraction from Aluminosilicates
Dr Seth Olsen, Monash University	45	0	Computational models of catalysis and mechanism in green and smart energetic materials

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Robert Woodcock, CSIRO	43	0	Eartth Observation and Informatics
Prof Evatt Hawkes, University of NSW	43	0	Direct Numerical Simulations of Turbulent Combustion - Ancillary project
Dr Saleh Shahinfar, University of New England	42	0	Sheep CRC Carcase Project
Dr Rob Patterson, University of NSW	41	0	Materials discovery and theoretical development for photovoltaics and nanomaterials
Researcher Michael Moore, Geoscience Australia	40	0	Mitigation of Site Specific Errors from Geodetic Time Series
Dr Leonardo Hardtke, University of Technology, Sydney	40	0	Bioinformatics
Mr Adam Phipps, Victor Chang Cardiac Research Institute	40	0	VC Harvey
Dr Leonard Hamey, Macquarie University	40	0	Multi-modal machine learning for clinical decision support
Mr Richard Miller, Macquarie University	40	0	Hyper Spectral TEM Image Classification
Dr Andrew Fowlie, Monash University	40	0	Analysing Beyond the Standard Model physics with NCI computing time
Dr Rippei Hayashi, Australian National University	40	0	deciphering splicing code during development
Dr Fatemeh Salehi, Macquarie University	40	0	Particle dynamics
Dr Frank Colberg, University of Tasmania	40	0	Modelling sea level extremes in response to global warming
Mr Richard Miller, Macquarie University	40	0	Random Forests Machine Learning
Dr Sophie Calabretto, Macquarie University	40	0	Absolute versus convective instabilites in three-dimensional boundary layers
Prof Antony Hosking, Australian National University	39	0	(Advanced Program Analysis for) Software Vulnerability Discovery and Mitigation
Mr Frank Antolasic, Royal Melbourne Institute of Technology	38	0	Determination and comparison of theoretical vibrational spectra with experimantal data
Dr Subhasish Mitra, University of Newcastle	38	0	Multi-scale simulation of flotation process for mineral separation
Prof Buyung Kosasih, University of Wollongong	36	0	Additive manufacturing, modelling and performance evaluation of 3D printed fins for surfboards
Dr Marjan Hadian-Jazi, La Trobe University	36	0	XFEL data analysis
Dr Citsabehsan Devendran, Monash University	36	0	Piezoelectric-Acoustic Interactions within Acoustofluidic systems
Dr Jayasinghe Jayasinghe, University of NSW	35	0	Higher order moments to attack random encryption countermeasures
Prof Eric Kennedy, University of Newcastle	35	0	Solid Oxide Fuel Cells
Prof Martin Leary, Royal Melbourne Institute of Technology	35	0	Additive Manufacture (AM) of Ti lattice structures
A/Prof Ahmad Jabbarzadeh, University of Sydney	34	0	Multiscale Simulations of Polymeric Systems
A/Prof Wouter Schellart, Overseas University	34	0	Geodynamic models of episodic mountain building
Prof Hussein Abbass, UNSW Canberra	33	0	Trusted Autonomy Group
Dr Carthigesu Gnanendran, UNSW Canberra	32	0	Prediction of Time-dependent Long-term Performance of Road Embankments On Soft Compressible Soils
Dr Matt Baker, University of NSW	32	0	Engineering Ancestral Molecular Motors

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Mr Aaron Scott, University of Newcastle	31	0	University of Newcastle - IT Services - Development and Test Project
Prof Mark Hoffman, University of NSW	31	0	Design using genetic algorithms
Dr Junfang Zhang, CSIRO	31	0	Molecular Dynamics Study of Gas Storage and Transport in Coals
Dr Daniel Lester, Royal Melbourne Institute of Technology	30	0	The Tensorial Rheology of Strong Colloidal Gels
Dr Jason Potas, University of NSW	30	0	Machine learning of sensory signals
Mr Samuel Sauvage, Bureau of Meteorology	30	0	Australian Fire Danger Rating Prototype
Dr Bernadette Sloyan, CSIRO	30	0	CSHOR Indo-Pacific Interbasin Exchange
Mr Matt Paget, CSIRO	30	0	Data Cube Rangelands and Crop Mapping Applications
Ms Nicholas Hannah, Other Australian	30	0	Double Precision Pty Ltd
Prof Nail Akhmediev, Australian National University	30	0	Nonlinear Optics in Specialty Fibers and Their Applications
Dr Apurv Kumar, Australian National University	30	0	Liquid sodium boiling in solar receivers
Dr Philip Nakashima, Monash University	30	0	Using quantitative convergent-beam electron diffraction to measure electron fluid dynamics with attosecond time resolution.
Dr Dawei Su, University of Technology, Sydney	30	0	Materials architecture design for low-cost energy storage application
Dr Garth Pearce, University of NSW	30	0	Modelling of Textile Composite Structures
Prof Michael Collins, Australian National University	30	0	Molecular Potential Energy Surfaces and Properties of Large Molecules
Dr Johnathan Kool, Geoscience Australia	30	0	Australian Marine Video and Imagery Processing
Dr Xi Li, Australian National University	30	0	Testing and prototyping of Arvados, a massive genomic data sharing platform, on Tenjin
Dr Edward Simpson, Australian National University	30	0	Nuclear reactions and structure
Dr Tony Vo, Monash University	28	0	Influence of Thermal and Shear destabilisation in Duct Flows Subject to a Strong Transverse Magnetic Fields
A/Prof Falk Scholer, Royal Melbourne Institute of Technology	27	0	Learning to rank for information retrieval
Dr Josh Milthorpe, Australian National University	27	0	Improving performance of the Chapel language for high-performance computing
Dr Nicholas Deutscher, University of Wollongong	27	0	Trace gas retrievals from solar FTIR
Dr Murat Tahtali, UNSW Canberra	26	0	Imaging Through the Atmosphere, L-SPECT simulation and reconstruction
Dr Qi Shao, University of Queensland	25	0	Large-scale 3D geophysical data inversion using finite element method based software esys-escript (2018-2019)
Dr Simon Campbell, Monash University	25	0	Convective nuclear burning in 3D - Fixing the weak link in stellar models
Mr Takuya Iwanaga, Australian National University	25	0	Exploratory analysis of an integrated environmental model
Dr Cagri Kumru, Australian National University	25	0	The road to efficiency

NATIONAL COMPUTATIONAL INFRASTRUCTURE

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Sebastian Kurscheid, Australian National University	25	0	Systematic optimization of parameters for ChIP-Seq peak calling algorithms using simulated short-read sequencing data
Prof Peter Gill, Australian National University	25	0	High-accuracy studies of electron correlation
Dr Oscar Branson, Australian National University	25	0	Mapping Reef Flat Environments from Satellite Imagery
Dr Dan Andrews, NCI/Australian National University	25	0	Canberra Clinical Genomics; translating the latest research findings into personalised medicine
Prof Paul Cally, Monash University	25	0	Numerical modelling of MHD effects and sunspot interior structure and dynamics
Dr Paul Slade, Australian National University	25	0	Efficient model choice for measurably evolving populations
Dr Wei Wen, University of NSW	24	0	Image Processing for An International Consortium on Cerebral White Matter Lesions
Prof Eric Kennedy, University of Newcastle	24	0	Catalytic combustion of methane
Miss Nerida Wilson, Geoscience Australia	24	0	SRTM DEM processing
Dr Akram Hourani, Royal Melbourne Institute of Technology	23	0	Autonomous Distributed Simultaneous Localization and Mapping
Dr Denis O'Meally, University of Sydney	23	0	Koala genome project, genome annotation
Prof Raina MacIntyre, University of NSW	22	0	Phylodynamics of infectious diseases
Prof Andy Pitman, University of NSW	22	0	Land Surface Science
Dr Giuseppe Barca, Australian National University	22	0	Development of quantum chemistry algorithms exploiting heterogeneous computing
Dr Callie Little, University of New England	22	0	Exploring gene by environment interactions using a whole-genome approach
Dr Yansong Shen, University of NSW	22	0	Multi-scale studies of gas-solid reactive flows
Dr Christopher McAvaney, Deakin University	22	0	Deakin eResearch kick start project
Prof Eric Kennedy, University of Newcastle	22	0	Non-equilibrium plasma conversion of toxic halogenated compounds and waste halogenated refrigerants to value added polymers - continuing
Dr Simon Watt, UNSW Canberra	21	0	Modelling and simulation of overdominance in genetic variation
Dr Shamila Haddad, University of NSW	21	0	Using WRF for urban climate simulations and heat island mitigation in Australia
Dr Varghese Swamy, Monash University	21	0	First-Principles Modeling of Functional Titanium Dioxides and Hybrid Metalorganic Perovskites
Dr Hamid Roshan, University of NSW	20	0	Multi-scale poromechanics
Mrs Rikki Weber, Geoscience Australia	20	0	Development of volcanic risk models
Dr Ralf Haese, Geoscience Australia	20	0	Multiphase fluid flow and heat transport modelling with Tough2-MP
Dr Torsten Thomas, University of NSW	20	0	Assembly of next-generation sequencing data for microbial metagenomes
A/Prof Aaron Oakley, University of Wollongong	20	0	Dynamics of DNA Clamps and Clamp Loaders
Dr Sheena McGowan, Monash University	20	0	Structural characterisation of malarial drug targets
Dr Wade Blanchard, Australian National University	20	0	Bayesian analysis of long term ecological data

Lead CI, Institution	Total Allocation in kSU	NCMAS Allocation in kSU	Project Title
Dr Apurv Kumar, Australian National University	20	0	Heat transfer and performace analysis of a liquid sodium receivers
Dr Marlies Hankel, University of Queensland	20	0	QCIF test project
Dr Mark Schira, University of Wollongong	20	0	Automatic Segmentation of Brain Tissues in Functional MRI
Mr Adam Phipps, Victor Chang Cardiac Research Institute	20	0	VC - Graham
Mr Marcus Tree, DHI	20	0	DHI-025
Prof Rick Franich, Royal Melbourne Institute of Technology	20	0	Medical Physics monte carlo Radiation Transport Simulation
Ms Stephanie Palmer, Australian National University	20	0	Genomic Data Management and Analysis
Dr David Lescinsky, Geoscience Australia	20	0	Assessing geothermal energy potential for the Australian Continent
Dr Shankar Kalyanasundaram, Australian National University	20	0	Finite Element Modelling of Engineering Systems
Prof LiangChi Zhang, University of NSW	20	0	Multiscale mechanics of metal/semi-conductor/bulk metallic glass (BMG) systems, mixed lubrication and fibre-reinforced composites
Various Researchers	1293	0	Small Allocations - Not Specified
Total Allocations	**784,186**	**113,186**	

International downloads of data stored at NCI in 2017–2018

Researchers from all over the world come to NCI to access particular datasets that we store for the scientific community.

Europe	Hits	Download (MB)	Europe	Hits	Download (MB)
Germany	1395427	7768695	Finland	3366	501
Italy	42077	3814308	Ireland	4910	262
Slovakia	191730	3692371	Denmark	3024	234
Great Britain	1459192	1485270	Austria	2591	184
France	176531	737635	Bulgaria	7360	158
Norway	28837	597769	Slovenia	1425	16
Belgium	2910	71320	Hungary	780	12
Sweden	3243	41263	Romania	3172	7
Switzerland	16350	30338	Portugal	1568	7
Greece	27243	21836	Serbia	244	6
Netherlands	35794	19020	Luxembourg	329	5
Estonia	454	17563	Albania	1682	3
Poland	5383	7595	Iceland	339	1
Ukraine	35120	4948	Belarus	127	1
Russian Federation	17390	3887	Lithuania	84	1
Czech Republic	2988	3511	Croatia	105	1
Spain	20285	1931	Other Countries	241	1
Latvia	231	707	**Total**	**3,492,532**	**18,321,367**

Asia	Hits	Download (MB)
Taiwan	43356	18500544
Republic of Korea	5769991	8648320
Hong Kong	665727	5850366
Malaysia	96177	2118041
Japan	114084	1488998
China	121741	887227
Singapore	66568	856348
Philippines	5101	110600
India	21293	20829
Islamic Republic of Iran	4026	4360
Vietnam	4280	966
Indonesia	5744	661
Israel	2068	317
Nepal	261	140
Oman	44	105
Thailand	3743	71
Kazakhstan	445	24
Myanmar	6	13
Cambodia	593	11
Pakistan	2386	9
Turkey	2138	8
Georgia	1124	6
Sri Lanka	230	6
United Arab Emirates	1262	5
Armenia	124	2
Iraq	83	1
Bangladesh	693	1
Saudi Arabia	102	1
Mongolia	47	1
Other Countries	615	1
Total	**6,934,052**	**38,487,981**

North America	Hits	Download (MB)
United States of America	2502652	18549079
Canada	58976	172531
Mexico	4066	21
Dominican Republic	23	6
Trinidad and Tobago	11	6
Puerto Rico	68	1
Panama	91	1
Other Countries	167	1
Total	**2,566,054**	**18,721,646**

South America	Hits	Download (MB)
Brazil	32511	3132906
Chile	27879	884612
Peru	7451	358029
Argentina	1579	5615
Uruguay	1782	5045
Bolivia	626	58
Colombia	952	4
Ecuador	1011	2
Venezuela	146	1
Other Countries	58	1
Total	**73,995**	**4,386,272**

Africa	Hits	Download (MB)
South Africa	5432	815
Reunion	126	162
Tunisia	90	158
Nigeria	120	10
Madagascar	1235	5
Morocco	2486	5
Cote D'Ivoire	54	2
Mauritius	347	2
Egypt	477	1
Other Countries	935	1
Total	**11,302**	**1,160**

Oceania	Hits	Download (MB)
Australia	454382130	2794230593
New Caledonia	25774	1139523
New Zealand	68315	485726
French Polynesia	642	22
Palau	14	1
Other Countries	206	1
Total	**454,477,081**	**2,795,855,866**

	Hits	Download (MB)
Grand Total	**467,555,016**	**2,875,774,291**

NCI Links to Government Portfolios

Through our integrated big data and high-performance computing services, NCI enables research that directly impacts many areas of interest to the Federal Government. This table describes some of those key areas.

Government Department Impacted	Programme/Agency Impacted	Activities/Projects supported by NCI
Education and Training	Australian Research Council (ARC)	Dependencies from more than 300 projects funded by the ARC's National Competitive Grant Programs (NCGP)
	NCRIS	Support for services provided by eight other NCRIS Capabilities
		Collaboration with Australian Research Data Commons
Industry, Science and Technology	CSIRO	Australian Community Climate and Earth System Simulator (ACCESS)
		Earth Systems and Climate Science (ESCC) Hub of the NESP
		Climate and Weather Science Data Enhanced Virtual Laboratory
		Marine Virtual Laboratory
		AuScope Virtual Research Environments Geoscience Data Enhanced Virtual Laboratory
		CMIP6 Climate Dataset
	CSIRO and the Australian Institute of Marine Science (AIMS)	eReefs
	Geoscience Australia (GA)	Australian Geoscience Data Cube (AGDC)
		Copernicus Data Hub
		Uncover Initiative
		National Reference Grid
		Exploring For The Future Initiative
		Water Observations from Space (WOfS)
		Australian Natural Hazards Data Archive
		AuScope Virtual Research Environments Geoscience Data Enhanced Virtual Laboratory

Government Department Impacted	Programme/Agency Impacted	Activities/Projects supported by NCI
Environment	National Environmental Science Programme (NESP)	Earth Systems and Climate Science Hub
	Environmental policy development	eReefs
		CMIP6 Climate Dataset
	Bureau of Meteorology	ACCESS
		ESCC Hub of the NESP
		Climate and Weather Science Data Enhanced Virtual Laboratory
		Marine Virtual Laboratory
		BARRA Reanalysis
	Australian Antarctic Division	Antarctic Climate and Environment CRC (ACE-CRC)
Health	National Health and Medical Research Council	Dependencies from more than 20 NHMRC funded projects and fellowships
		Australian Genomics Health Alliance (AGHA)
Agriculture and Water Resources	Policy development for the agricultural industry and water resources	ACCESS development with BoM/CSIRO; Development and hosting of the AGDC with GA and CSIRO, and WOfS with GA
		Digital Earth Australia Collaboration with GA
	Murray-Darling Basin Authority	Exploitation of AGDC data
		Digital Earth Australia Collaboration with GA
Resources and Northern Australia	Geoscience Australia	Exploring for the Future Initiative
		AuScope Virtual Research Environments Geoscience Data Enhanced Virtual Laboratory
		Digital Earth Australia Collaboration with GA
Defence	Australian Geospatial Intelligence Organisation (AGIO)	Onshore topographic data and products provided by GA
	Australian Hydrographic Service (AHS)	Raw and processed bathymetric data collections provided by GA
Foreign Affairs; Trade, Tourism and Investment	Policy development for, and by, the tourism sector	eReefs (through CSIRO)
Infrastructure, Transport and Regional Development	Australian Marine Safety Authority (AMSA)	Managing risks to marine vessels in Australian waters (undertaken with consultant DHI)
	Aviation Programs	Weather reports for the aviation industry
	Transport Infrastructure Programs	National Reference Grid

Outreach

Every year, NCI engages with various communities to communicate with them about big data and high-performance computing. This includes public events, school tours, training sessions and high-profile visits. It also includes a large amount of academic engagement in the form of conference presentations and academic publications.

Tours and Events

Group	Date
Training at Monash University	12–14 July
Australian Academy of Science Policy Team visit	21 July 2017
Science in ACTion	11–12 August 2017
MoST Taiwan Visit	16 August 2017
Engineering students from ANU	23 August 2017
Creating Knowledge VC Students	24 August 2017
HPC Spring Session Training	4–8 September 2017
Tour for Taiwan visitors	11 September 2017
Professor Petter from Simon Fraser University	19 September 2017
TERN visit	4 October 2017
Staff from Senator Matt Canavan's office visit about DEA	13 October 2017
eResearch Brisbane	16–19 October 2017
National Science Week Coordinators Tour	16 October 2017
Visit from ARCCSS workshop scientists	2 November 2017
Visit from Professor Michael McRobbie from Indiana University	6 November 2017
SC17 in Denver, USA	13–16 November 2017
NCI Allinea Training	11–12 December 2017
Visit from OZEWEX researchers	12 December 2017
Visit from Questacon Smart Skills coordinators	19 December 2017
NYSF Students Group 1	5 January 2018
ANU Dean of Health and Medicine Prof Jane Dahlstrom Visit	10 January 2018
National Mathematics Summer School Tours	17–18 January 2018
NYSF Students Group 2	19 January 2018
Visit from Rachel Stephen-Smith MLA	24 January 2018
Visit from Senator Zed Seselja Assistant Minister for Jobs, Innovation and Science	25 January 2018

Group	Date
CECS Summer School Tours	30–31 January 2018
Geoscience Australia Training	23 February 2018
Tiwi Islands Genomics Project Visitors	2 February 2018
Visit from Shane Rattenbury MLA, ACT Minister for Sustainability	7 February 2018
Visit from ANU students in Ben Corry's Lab	28 February 2018
Visit from Geoscience Australia grads	15 March 2018
Senator Lee Rhiannon Visit	20 March 2018
University of New South Wales Training	20–21 March 2018
Autumn Session HPC Training and Visit to NCI	9–13 April 2018
Singaporean Teachers Visit	9 April 2018
Visit from JW Saputro from Indonesian National Science Foundation	17 April 2018
ANU Research Capabilities Expo	2 May 2018
Visit from ANU COMP Class	16 May 2018
Introduction to HPC Workshop at C3DIS	28 May 2018
Visit from Skaidrite Darius, ANU's first female computer programmer	4 June 2018
Deakin University Training	19 June 2018
ISC2018 in Frankfurt, Germany	25–28 June 2018
ARC CSS Climate Showcase at Old Parliament House	27 June 2018
CECS Girls in STEM visit	28 June 2018
Training visit from Centre of Excellence for Climate Extremes	29 June 2018

Presentations and Publications

Date	Event/Conference/Meeting	Location
July 2017	Collaborative Conference on Computational and Data Intensive Science (C3DIS 2017)	Melbourne, Australia
August 2017	HPC@gov.au Presentations	Canberra, Australia
Canberra, Australia	QUESTnet	Gold Coast, Australia
August 2017	Free and Open Source Software for Geospatial Conference	Boston, USA
August 2017	Asia Pacific Advanced Network meeting (APAN44)	Dalian, China
September 2017	Research Data Alliance 10th Plenary	Montreal, Canada
September 2017	17th Annual Global Lambda Grid Workshop	Sydney, Australia
September 2017	Molecular Modelling and MolSim Workshop	Perth, Australia
October 2017	PBS User Group	Brisbane, Australia
October 2017	eResearch Australasia	Brisbane, Australia
October 2017	Predictive Geoscience Conference	Orleans, France
November 2017	Openstack Conference	Sydney, Australia
November 2017	SC17 (SuperComputing 17)	Denver, USA
November 21017	Energy Materials and Nanotechnology (EMN) Meeting	Dubai, United Arab Emirates
December 2017	Earth Science Grid Federation Face-to-Face Conference	San Francisco, USA
December 2017	American Geophysics Union Fall Meeting	New Orleans, USA
February 2018	GPU Tech Summit	Santa Clara, USA
February 2018	NASA AMES Research Centre	Mountain View, USA
February 2018	NEUBIAS conference (Network of European Bioimage Analysts)	Szeged, Hungary
February-March 2018	Monash Lectures	Melbourne, Australia
March 2018	International Symposium on Grids and Clouds 2018 (ISGC)	Taipei, Taiwan
March 2018	Findable, Accessible, Interoperable and Reusable Data Meeting	Potsdam, Germany
March 2018	Research Data Alliance 11th Plenary	Berlin, Germany
March 2018	Supercomputing Asia 2018	Sentosa, Singapore
March 2018	Asia Pacific Advanced Network meeting (APAN45)	Singapore, Singapore
April 2018	European Geosciences Union	Vienna, Austria
May 2018	9th European Infrastructure Workshop	Bologna, Italy
May 2018	Consortium for Ocean-Sea Ice Modelling in Australia (COSIMA 2018)	Canberra, Australia
May 2018	Drishti Workshop	Nanjing, China
May 2018	PRACEdays18 Conference	Ljubljana, Slovenia

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May 2018	Collaborative Conference on Computational and Data Intensive Science (C3DIS 2018)	Melbourne, Australia
June 2018	TERENA Networking Conference (TNC18)	Trondheim, Norway
June 2018	6th Accelerated Data Analytics and Computing Workshop	Zurich, Switzerland
June 2018	International Industry Supercomputing Workshop	Frankfurt, Germany
June 2018	DMF (Data Management Framework) User Group	Brisbane, Australia