NATIONAL COMPUTATIONAL INFRASTRUCTURE

FUTURE INDUSTRY AND NEXT-GEN TECHNOLOGIES

NCI's high-performance computing platform gives scientists the power and ease-of-use to model the physics and chemistry behind next-generation technologies such as solar cells, batteries and lasers.

Complex molecular systems require large-scale simulations to understand the properties of new solutions before synthesis or fabrication, while complex coupled systems, such as the turbulent combustion of next-generation fuels, require extreme levels of computation, spanning a significant fraction of the supercomputer, to generate meaningful and insightful results.

By using computational models as the first step in designing new molecules or nanotubes, ARC-funded researchers from around the country leverage NCI's expertise and computational capability in designing products for Australia's future industries. NCI enables scientific research working at the small and incredibly detailed scales that chemistry and physics need.

IMPACTED GOVERNMENT PORTFOLIOS:

Industry, Innovation and Science
Environment and Energy

Such research groups take advantage of the supercomputer to do science that would be out-of-reach of any standard computing environment. Leveraging the high-performance infrastructure and expertise that NCI offers, they make advances that are leading to Australia's future technologies.

One group associated with an ARC Centre of Excellence (CoE) managed to double the efficiency of solar cells by finding a new compound that more effectively transports electrons, all based on large-scale calculations that investigated many molecules before finding one that worked.

Separate research, also supported by ARC CoEs, is investigating nanomaterials for use in lasers and low-light sensors. Before the costly and time-consuming process of producing nanomaterials or nanodevices begins, simulations of the candidate structures are run at NCI to narrow down the most likely configurations, and refine the design.

NCRIS National Research Infrastructure for Australia
An Australian Government Initiative

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