

## Swinburne Commons

### Transcript



Title: The Swinburne supercomputer: finding diamonds in astrophysical haystacks

(Research at Swinburne)

Author(s): Matthew Bailes

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Well, the Swinburne Supercomputer is actually a national facility that provides computational infrastructure to all of the astronomers in our nation, as well as to the scientists and engineers who use it here at Swinburne. It's almost 400 teraflops, which is such a large number that it's kind of astronomical in scale. And what that means is every second it can do 400 trillion operations. That's about as good as anything in Australia, and comparable to the best computers in the world.

It's got a particularly green element to it, in that the processors we're using are actually very efficient at the number of watts, or how much energy it uses. We always dreamed about having a really big machine that can tackle the biggest questions about how the universe was formed and evolved. And so we started planning several years ago a new building that would be capable of holding up to a megawatt of supercomputer. We then partnered with AAL, and brought in \$1 million of education endowment fund resource, which enabled us to put together a multimillion dollar bid to secure the supercomputer.

This computer, it's not just one really fast processor, it's tens of thousands of little processors that all can work in parallel. And that's the same kind of processor you need for everything from computational fluid dynamics to molecular simulation, and back to astronomy and engineering.

So this supercomputer is very special, in that it has a dedicated optical fiber that goes all the way from here in Hawthorne all the way up to the Parks Radio Telescope, made famous in the movie, The Dish. The Parks Radio Telescope is currently doing a massive survey of the sky for what's known as pulsars. These are special stars that give off radio emission. We then digitize that data at the telescope, and send it down the fiber link, and it gets processed here in real time on the Swinburne Supercomputer.

So the diamond planet was a really exciting discovery, made possible with the supercomputer and the fiber link. This enabled us to start followup observations very shortly after it was discovered, and it really gave rise to a very rapid discovery, follow up, publication cycle, which resulted in a paper in Science. If you say you've discovered a giant diamond in space, it makes them go ballistic. And we actually got to number five story on Google News internationally, which was amazing, and led to a half a million views on YouTube.

What we hope to do with this national facility is to really get international recognition by doing landmark simulations of the universe, and publishing that, and making the data sets available to the entire world.