



# national science week

## Jay Blanchard, School of Maths and Physics, UTAS *Supermassive Black Holes*

I think everyone goes through a phase where space is awesome. I never got out of that, I'm still satisfying my curiosity about the universe!

As a kid (and even today!) I used to spend hours outside with a pair of binoculars, just gazing up at the night sky. We're lucky in Tasmania because our skies are fairly dark. What do I mean by dark skies? Well, go outside at night and stand next to a bright light. Now look up, how many stars can you see? Walk a few meters until the light is blocked from your view (or turn it off!). See the difference? When you put a whole city worth of lights together you can barely see the stars at all!

What gets me is that all the stars you can see (something like 200 billion) live in our galaxy, the Milky Way, which is only a minuscule fraction of the Universe. Even then, some of the stars you can see twinkling merrily have long since died. We just don't know it yet because light takes time to travel and they are far enough away that the event of their death hasn't reached our eyes yet. The universe is huge...

I recently completed a Bachelor of Science with Honours at the University of Tasmania and am now continuing on to do my PhD in astrophysics. I study "active galactic nuclei" (AGN), inner cores of galaxies which emit more light than all the rest of the galaxy combined. These harbour supermassive black holes with masses millions of times that of the sun, and can produce gamma rays, some of the most energetic radiation known. I'm using the radio telescopes at Mt. Pleasant and Ceduna to complement NASA's Fermi gamma ray space observatory, in order to try and find out where and how these gamma rays are produced.

Gamma-rays, radio waves, X-rays, are all the same thing really, light. We don't call them that because light is the part of the spectrum our eyes happen to work at. So radio waves are just really low energy light waves, and gamma-rays are really energetic light waves. Observing radio waves is cool because it lets me look through clouds, and rain, and even space dust. In fact, using radio telescopes means I don't even have to wait for night! They work just as well during the day.

