

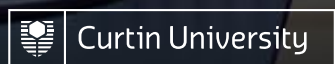


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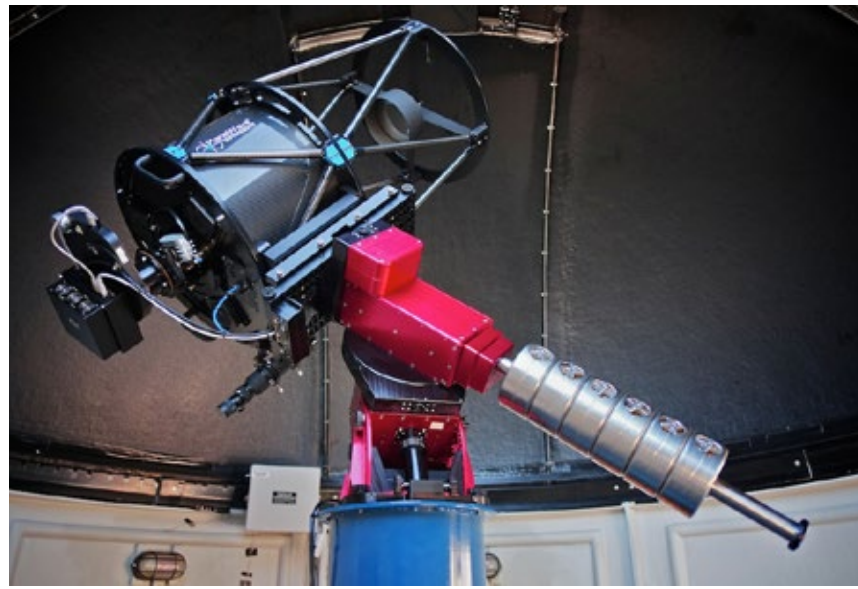
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## SPIRIT STUDENT OBSERVATORY

CASE STUDY







## THE SPIRIT STUDENT OBSERVATORY

ICRAR's world-class SPIRIT program gives WA school and university students the chance to make real contributions to science without having to leave the classroom. The program is unique in Australia and has inspired hundreds of budding scientists at dozens of WA high schools since its launch in 2010.

As a Year 10 student at Mt Lawley Senior High School, Gurashish Singh Bhatia was thinking about studying economics. But when his science teacher introduced the bright 15-year-old and his classmates to ICRAR's SPIRIT telescopes, everything changed. Gur, as he is known, became so fascinated by astronomy he decided to study physics at university.

While still in high school, Gur used the SPIRIT telescopes to measure the positions of asteroids billions of kilometres away, and submitted his findings to the International Astronomical Union's Minor Planet Centre at Harvard University. His measurements—accurate to fraction of a degree—were credited and published.

Gur is one of hundreds of students inspired by SPIRIT, a web-enabled telescope initiative that gives WA schools access to the same tools used by professional astronomers to observe and collect astronomical data. Participants are able to remotely access two research-grade robotic telescopes, known as SPIRIT I and SPIRIT II, using just a web browser.

The telescopes are located on a roof at UWA and students can access them through the Internet from their school or home computers. They can direct the telescopes to take images of distant astronomical objects or even schedule automated data acquisition for sophisticated research projects. Access to SPIRIT telescopes is free for all teachers and students in Western Australia.

ICRAR's Paul Luckas, who built the telescopes and manages SPIRIT, said the program was unique in Australia. "SPIRIT is the country's only continually operating educational robotic telescope outreach initiative," he said. "Worldwide it remains one of only a handful of successful web-enabled outreach telescopes with remote, real-time operation."

**While still in high school, Gur used the SPIRIT telescopes to measure the positions of asteroids billions of kilometres away.**

SPIRIT is in high demand from local university students using the telescopes for astrophysics projects as well as high school students around the State, many of whom are taking part in academic extension programs. Both SPIRIT I and SPIRIT II are often booked solid by multiple users for weeks at a time, with observations taking place from dusk until dawn on any given night.

At Iona Presentation College, for instance, 44 girls recently spent a semester taking part in a SPIRIT astronomy immersion pilot, capturing photographs of the heavens and doing real research with the SPIRIT telescopes. The students used SPIRIT to observe variable stars - stars that change brightness - and created light curves based on their observations.

The Iona students submitted their work to the American Association of Variable Star Observers, who verified the data before publishing it for use by the astronomy community around the world. The girls' research has also featured in publications including *Australian Sky and Telescope* and the *Variable Stars South* monthly circular.

Mr Luckas said astronomy is one of the last areas of science where amateurs can make new discoveries. "This is students doing genuine science," he said. "In fact, some of the students are now coming to ICRAR because of it. We've had three or four of them wanting to study astrophysics because they used SPIRIT in Year 9 and 10."

**"SPIRIT is the country's only continually operating educational robotic telescope outreach initiative."**

PAUL LUCKAS  
ICRAR

At Iona, Year 11 student Victoria Wong applied for extraordinary work experience at ICRAR during the school holidays after taking part in the SPIRIT astronomy immersion program. Victoria is set to be mentored by an astrophysicist and plans to study astronomy at university in 2019.

SPIRIT is also an essential tool for many university students, such as Swinburne University Masters candidate Kate Blackham. Kate accessed the observatory from the UK, using SPIRIT I to observe and produce light curves for three stars. She said the telescope was absolutely vital to the success of her project. "The high-quality equipment, excellent location, well-written manuals and automated user interface meant I was able to acquire excellent images with a not insurmountable learning curve," Kate said. "[It's] an outcome that I am extremely grateful for and would have been impossible without SPIRIT."

SPIRIT is just one example of how ICRAR's outreach programs are providing opportunities in science and technology for young West Australians. "To the extent that ICRAR is on the cutting edge of science, it's also on the cutting edge of outreach," Mr Luckas said. "Giving people the chance to be involved in real research in this way is making a genuine impact on the students and their choices in upper high school and beyond."



**Top** Gur standing next to SPIRIT II.  
**Bottom** Students from Iona Presentation College Perth visiting the SPIRIT observatories with their science teacher Katrina Prendergast and coordinator of the SPIRIT program, Paul Luckas.