ICRAR’s online citizen science project AstroQuest has seen over 10,000 volunteers sign up to help WA astronomers better understand how distant galaxies grow and evolve. The initiative was a finalist in the 2020 Eureka Prizes for Innovation in Citizen Science.

AstroQuest volunteers support astronomers by studying images of galaxies millions of light years from Earth, and working out which light is coming from which galaxy. The innovative project combines the power of the human brain with the best of computer algorithms and machine learning.

The work helps researchers like ICRAR-UWA astrophysicist Dr Luke Davies. “When you go outside and look up at the night sky, there’s a lot of black with all of the stars dotted around,” Dr Davies says. “But when you look with a very powerful telescope for a long time, you actually see that there are galaxies and stars everywhere, all over the sky. It’s really, really crowded, and many galaxies and stars overlap.”

To figure out which light is coming from which galaxy, astronomers run their observations through sophisticated computer algorithms. But the computer gets it wrong in about 5 to 10 per cent of cases. It’s simply no match for the human eye and brain.

AstroQuest volunteers—or AstroQuesters—are asked to check the computer’s work. Where the algorithm gets it right, the volunteers mark it as correct. Where the algorithm gets it wrong, the volunteers mark it as incorrect and select a reason why. These galaxies are then inspected by professional astronomers. Every galaxy is studied by several volunteers, with the project aiming to have each galaxy ‘eyeballed’ at least five times.

Dr Davies says professional astronomers previously looked through all the galaxies to find the computer’s mistakes. “As more and more galaxies are surveyed, there simply aren’t enough researchers to do it,” he says.

““Our AstroQuest volunteers are essentially at the forefront of scientific research, helping million-dollar international projects from their computers at home.”

ICRAR citizen science project officer Lisa Evans says these answers are extremely helpful to astronomers. “There’s never been a citizen science project quite like this before. The results can help improve the algorithm being used to find galaxies in huge surveys. Plus the answers can be used to train machine learning algorithms to do this work better and faster.”

Dr Davies is a project scientist for the million-dollar international survey called WAVES. The ten-year initiative is the biggest effort ever to study galaxies. The project combines the power of the human eye and brain with the best of computer algorithms and machine learning.

The volunteers’ work means that only one-tenth of the galaxies processed by ProFound that currently require intervention will likely need human eyes in the future.

Dr Davies says professional astronomers

The famous antennae that currently require intervention will likely need human eyes in the future.