Citizen scientists discover what's out there

August 19 2015, by Tanya Hill

There are so many galaxies, you can write with them! writing. Credit: galaxyzoo.org/, CC BY-SA

It's National Science Week and this year the annual citizen science project run by ABC Science is astronomy-themed. No guesses for knowing that I'm excited about that! It's also a nod to 2015 being the International Year of Light – after all, it's by observing light that we know almost everything we do about the universe.

The project is Galaxy Explorer and citizen scientists are being called upon to help classify over 200,000 galaxies. A well-produced tutorial takes you through the different types of galaxies that you may encounter.

Is the galaxy messy and undefined? Or is it possible to see structure, such as spiral arms, a bright bulge or an elongated bar? You might even be lucky and see a pair of galaxies in mid-collision.

The galaxies are between 800 million to 4 billion light years away. Let's consider that for a moment. Even if all the galaxies you classify look quite small and blob-like (as many of the ones I looked at seemed to be), these galaxies are really distant. You are seeing light that has journeyed for up to 4 billion years before becoming trapped by the telescope.

A window into the past

This makes a great example of how light can tell us so much about the universe. Since the light has taken so long to reach us, it means we are looking back in time – seeing these galaxies as they were billions of years in the past. It's a window into the history of the universe.

And that's exactly why the data are so useful. The galaxies are from an Australian-led survey known as the Galaxy and Mass Assembly project (GAMA). By looking into the universe's past, it helps astronomers understand how galaxies build-up their mass and evolve over time.

There's more to the citizen science project too. As well as classifying each galaxy, you also have to fit a ring around the galaxy's edge, defining its boundary. This is a really fiddly measurement that can only be done by the human eye, computers are notorious for getting it wrong.

Classify these galaxy from Galaxy Explorer: a galaxy with a bright bulge, a barred spiral and a featureless galaxy. Credit: ABC Science

In the past, I've fitted many such rings to galaxies and it was quite a laborious task. Seeing how easily it could be done in this citizen science project – and on my iPad of all things! – was one of those personal moments of geeky joy.

Defining the size of the galaxy is important as it provides an estimate of how much light the galaxy emits. This can lead to determining how many stars the galaxy has (how massive it is) and how quickly new stars are forming (the star formation rate). Both are crucial for understanding galaxy growth and the evolution of the universe.

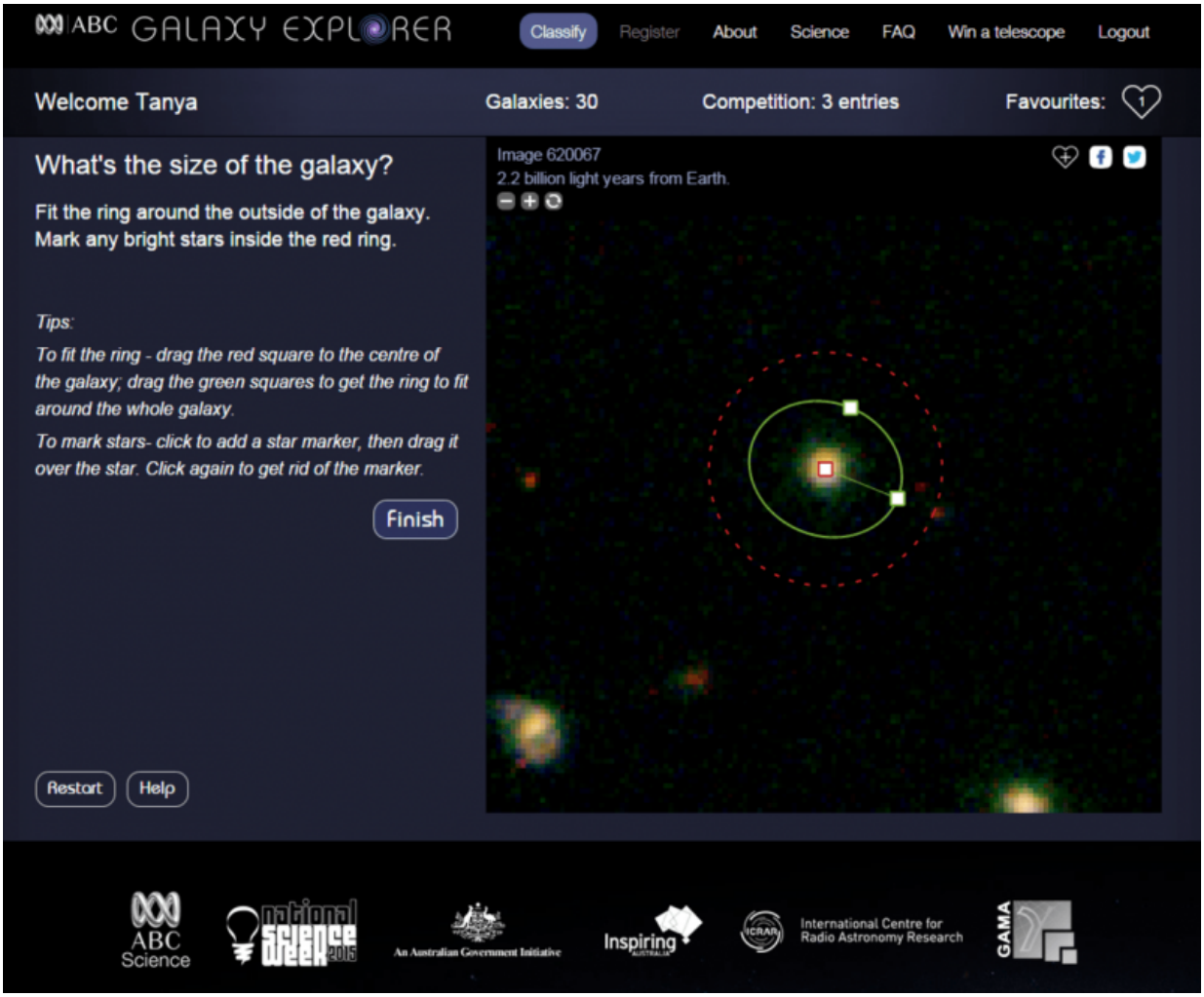
It's known that the universe hit its peak over 10 billion years ago. That's when galaxies were forming stars at full tilt. Since then things have been in steady decline and as recently announced, the GAMA survey has helped to show that the universe is slowly dying.

Science for everyone

There are many citizen science projects to be found and places such as Zooniverse can have you doing science from astronomy to zoology. The benefits are two-fold. Citizen scientists get to experience what it's like to work with data, the backbone of science, and real science gets done, helping researchers draw the most from their very large datasets.

Many interesting discoveries are made, particularly when volunteers and researchers begin working together. Such as the case of Hanny's Voorwerp, where an astronomical object was found that had never been

seen before.

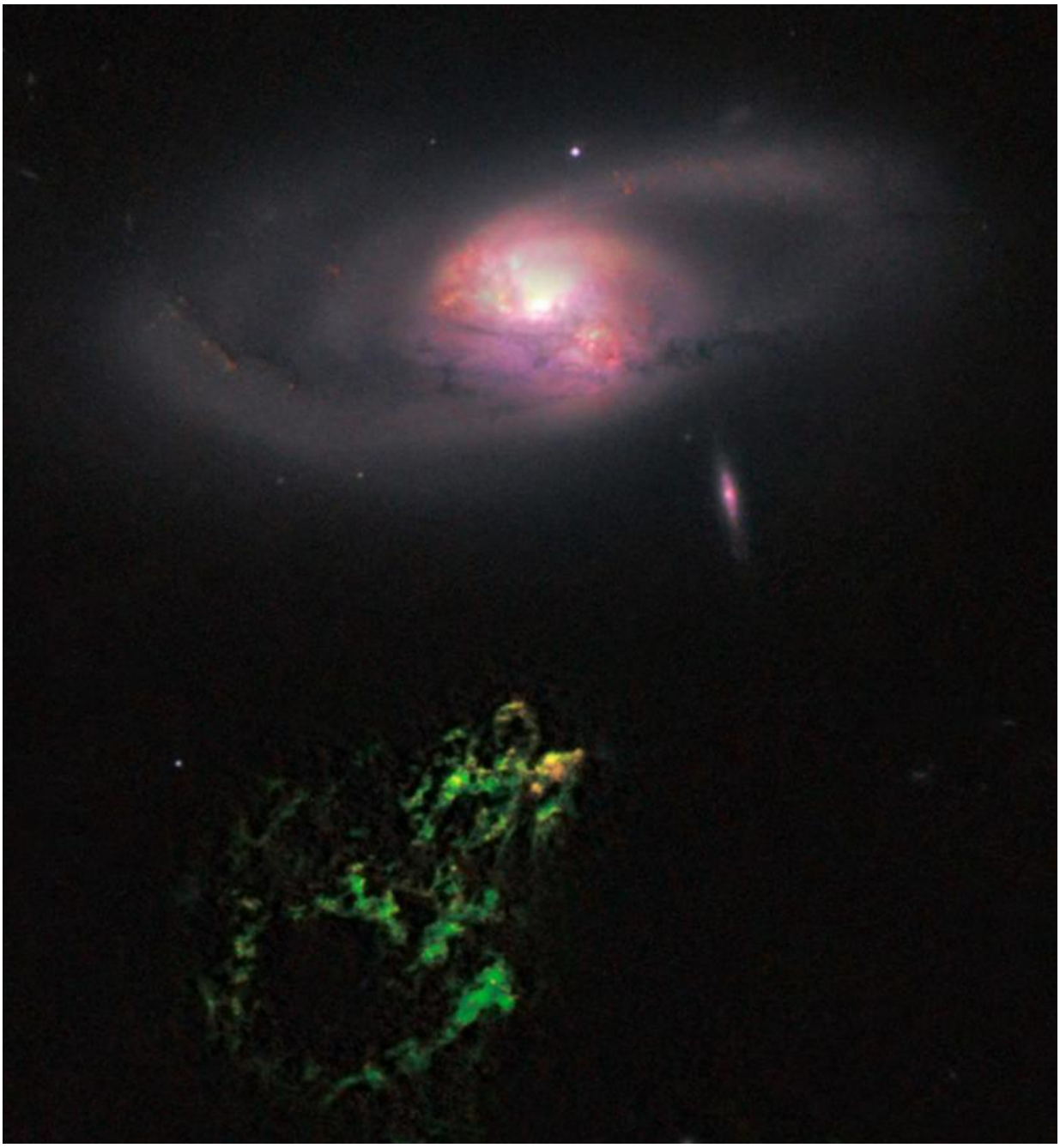


It’s easy to measure the size of the galaxy - move the green squares until the ring is snug around the galaxy.

What's more, many astronomical datasets are available on the web and are open to the public. There's more effort involved, but if you know how to search through the data, discoveries are there to made.

Australian comet hunter

Using publicly available data, Victorian amateur astronomer Michael Mattiazzo, recently discovered a new comet (C/2015 P3 SWAN). The data were obtained by NASA's Solar and Heliospheric Observatory (SOHO) and it's Mattiazzo's seventh comet discovery using SOHO data.

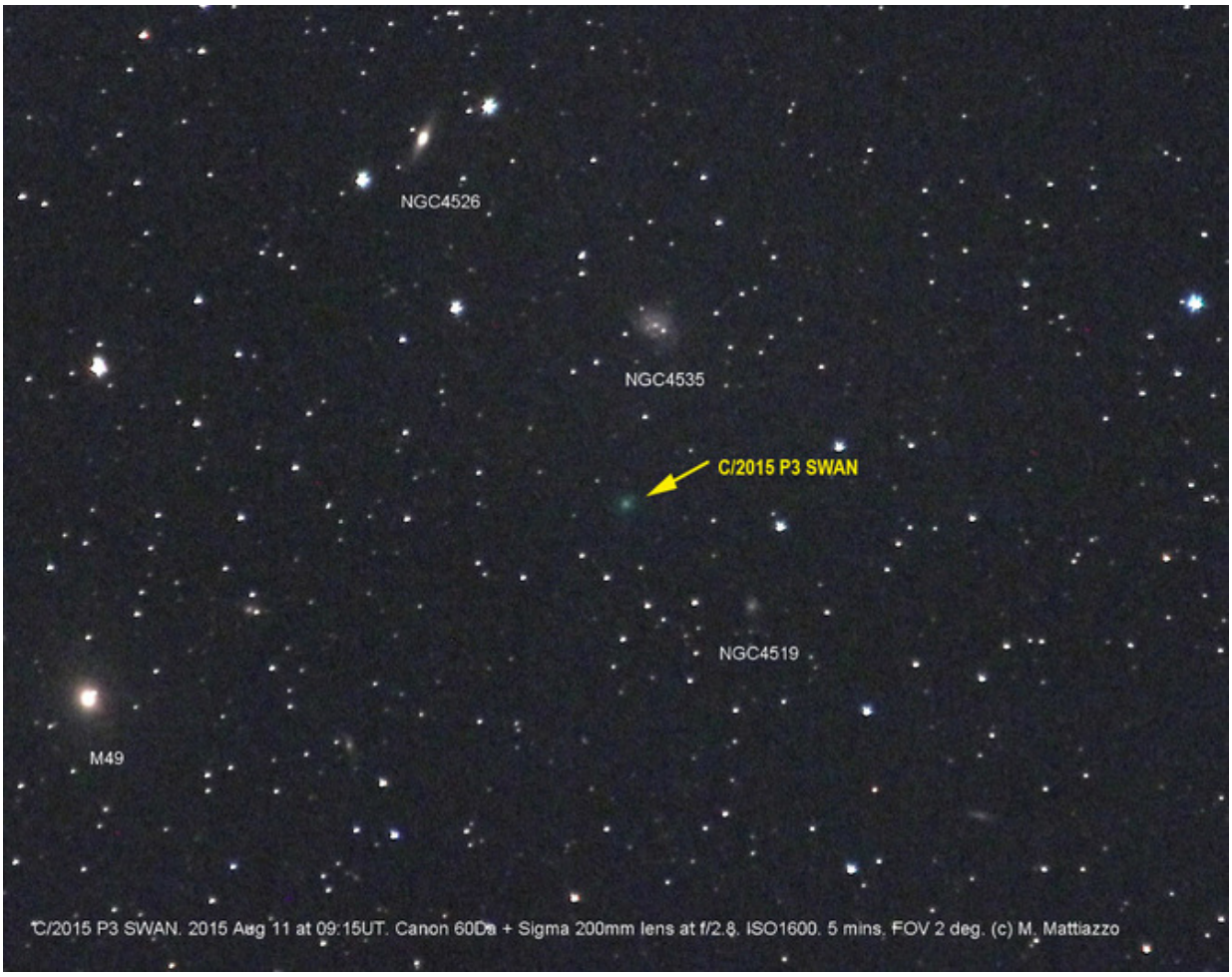


Hanny' s Voorwerp is the freakish green blob below the galaxy. It’s a stream of gas that’s making stars. Credit: NASA, ESA, W. Keel (University of Alabama), and the Galaxy Zoo Team

Mattiazzo's experience allowed him to spot a faint moving dot in a sequence of SOHO data, similar to the one shown above. The comet was very faint and hard to find against the background noise. As an amateur astronomer, he then photographed that patch of night sky and was able to confirm the presence of the comet. Now that's a different way to hunt down a comet!

If you want to try for yourself, the SOHO data can be accessed here and also here (click Latest Observations from the list on the left).

So there's no excuse. Citizen science projects can have us all exploring the world through science. And with that, I'm off to classify more galaxies.



The comet is seen in the night sky after first being discovered in data from SOHO. Credit: Michael Mattiazzo

Source: The Conversation