

Lesson 2 The World of Scientific Discovery

Science Is for Everyone

When we think about science, we might consider it as a domain reserved exclusively for scientists in long, white lab coats who spend their days conducting experiments and analyzing data. They seem to have very little in common with ordinary people like us. However, this perception is far from the truth. In reality, science belongs to everyone, and we all have the ability to play a role in the advancement of science. There have been numerous citizen science projects in which ordinary people have made contributions to remarkable scientific accomplishments. Let's take a look at two of them.

Classifying Galaxies

Kevin Schawinski was a young astronomy researcher studying black holes and the evolution of galaxies at the University of Oxford. This might sound exciting, but his job there was dull and time-consuming. He had to classify around one million images of galaxies according to their shape. Since they all looked similar but were actually shaped slightly differently, the best way to do this was to sort them while looking at each one individually. Of course, this would require a tremendous amount of time. It took Schawinski a whole week to classify just 50,000 galaxies. He thought, "But what about the remaining 950,000?"

One evening after work, Schawinski met a friend named Chris Lintott and complained about the situation. Lintott suggested that he turn to the Internet to ask other people for help. Eventually, the two men ended up launching a crowdsourced online project known as Galaxy Zoo. The website was kept as simple as possible, with a very basic design and an easy-to-use interface. This allowed those who wanted to participate to get started quickly. New visitors were greeted with a brief tutorial that explained the project. Then they were shown an image of a galaxy and asked to click buttons that described its features. Is the galaxy smooth and rounded? Is its shape an oval or a spiral? After completion of the tutorial and a little bit of practice, the participants were able to classify galaxies effectively.

It was online media that helped spread the word about Galaxy Zoo, bringing more and more participants to the website. Shortly after the website was launched, nearly 70,000 classifications were being made per hour. In a year and a half, more than 80,000 individuals participated, and they made more than 75 million classifications. If it had not been for those participants, Schawinski couldn't have classified that many images. In fact, it would have taken him decades on his own.

More than 15 years have passed since the project first began in 2007. Galaxy Zoo has now grown into Zooniverse, which is one of the most popular platforms on the Internet for ordinary people who want to participate in science projects. It is more active than ever before, with about 2 million registered users worldwide. It now offers a wide range of projects in astronomy, biology, physics, and more. If you want to get involved, you should definitely check it out!

Chasing Steve

In Alberta, Canada, there were some "aurora chasers" who formed an informal group online. They would leave their homes at night and try to get exceptional photographs of auroras. Then they would share them with the rest of the group.

In the summer of 2014, the group members began to notice something strange appearing in the night sky. There were unusual ribbons of green and purple light, some of which seemed to stretch for thousands of kilometers. Sometimes they lasted for just a few minutes, while other times they remained in the sky for a whole hour. They were similar in appearance to auroras, yet they possessed some notably different features. Unsure of what they were, the group decided to name the phenomenon "Steve," based on a scene from an animated movie where some characters give that name to an unfamiliar object.

After photographing Steve for several years and discussing what it might be, the group members decided to get help from experts. They showed their photos of Steve to a professor of astronomy at a local university and a scientist at NASA. Surprisingly, neither of them had any idea what Steve was. They confirmed that it was not an aurora, but it did not resemble anything they had seen before. They realized that the group had discovered a new type of phenomenon that had never been properly studied. In order to learn more about it, NASA funded a citizen science project involving the public. The project asked ordinary people to gather photos of Steve and send them to NASA. It is still in progress today.

In honor of the aurora chasers who first discovered the phenomenon, the name "Steve" has been kept. However, it is now written in all capital letters and stands for "Strong Thermal Emission Velocity Enhancement." Experts have acknowledged that it is the dedicated members of the aurora chasers group that deserve the credit for discovering STEVE. If it had not been for them, it might have remained unnoticed forever.

There are many interesting theories about STEVE, but none of them have been proven for certain.

Scientists and citizens continue to collaborate to solve this mystery, and they are learning more and more about STEVE every day.

Most of the individuals involved in these two projects are not professional scientists. Instead, they are citizen scientists—ordinary people who desire to help advance science in areas that they are interested in. Even though citizen scientists may not have science degrees or long, white lab coats, they are still capable of making valuable contributions to science. You can become one as well if you have curiosity and an interest in taking part in scientific research. The next great scientific achievement could be made by citizen scientists volunteering their time for the purpose of better understanding the world.