Where Am I?

An edited transcript of an interview with Dr. Brian Swimme

One way to get a sense for where we are in the Universe is to begin with home, which is our planet Earth. We have an amazing relationship with the sun. The sun is 93 million miles away, or eight light-minutes. We talk about distances in terms of how long it takes light to get somewhere. So when you see the sun, you are actually seeing the light that left there eight minutes before.

We live on one of the rocky planets. As you go farther away from the sun, you get to these larger planets like Jupiter. These are gaseous. They are not solid. If you were in a space ship, you could actually fly right through them. Traveling further away from Jupiter we get all the way out to Pluto, this tiny planet.

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The whole system, our solar system, is one of 200 billion different systems. That whole conglomeration is called the Milky Way galaxy, which we can see on a clear night as a ribbon of light. When you are looking at the Milky Way galaxy, you are looking at 200 billion stars.

The Milky Way galaxy is the fundamental unit of the Universe. It’s the shape of a pancake, or an egg with a yoke in the middle. Our solar system is two-thirds of the way out.

The whole size of the Milky Way galaxy is 100 thousand light-years across. That can be an overwhelming figure, but it is the size of our Milky Way galaxy. The light leaving one edge of the Milky Way takes 100 thousand years to get to the other end of it. And we live some 30 thousand light-years away from the middle of the Milky Way.

We are going around the Milky Way in a slow orbit along with 200 billion suns. Many of these other stars have planets as well. Which is a great discovery - we never knew that before. We never knew if other stars had planets. That's a recent discovery.

“If you go back in time, all of these galaxies emerged from a single point 13.7 billion years ago.”

Now, as you move out, you discover that around the Milky Way galaxy there are other galaxies - smaller ones that are actually circling around us. We call them satellite galaxies. The galaxy closest to ours, Andromeda, is also the same size as the Milky Way. There's something really interesting about Andromeda. It is the most distant object you can see with your naked eye. You can actually see it. The amazing thing is that it is 2 1/2 million light-years away. So, when you look at Andromeda on a clear night, the light that enters into your eye left two-and-a-half million years ago.

Imagine that we have developed the capacity to really see that light carefully. Imagine we could see all the way down to the planets of Andromeda, and see what's going on there. But what we would see is what was going on two-and-a-half million years ago. Now let’s reverse that perspective. Just

imagine that right now there are intelligent beings in Andromeda and they are looking at us - right now. And they have the spectacular ability to actually see what is going on, in the light that is arriving there. But they are seeing what was happening here 2 1/2 million years ago. That means they would be watching, in real time, the first humans develop the use of tools. They would see the first stone tools thrown up into the sky.

The system of galaxies - the Milky Way galaxy with its satellite galaxies, and Andromeda with its satellite galaxies...all together composing a couple dozen galaxies - is called the Local Group. The Local Group is moving as a whole around another system, the Virgo cluster. The Virgo Cluster is 50 million light-years away. It consists of 2500 galaxies, each containing 100 billion stars. It is a massive system. We are moving around the Virgo Cluster, and other galaxy clusters are moving around that as well. This entire system is called the Virgo Super Cluster.

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Now here is the amazing news. If we look out at the Universe from this Virgo super cluster, we find other super clusters, and all of them are moving away. Which means that the Universe as a whole is expanding. This was the great discovery of Edwin Hubble, who explained that we live in a Universe that had a beginning. If you go back in time, all of these galaxies emerged from a single point 13.7 billion years ago.

Right now, at this moment we are in the middle of this vast cosmic expansion. We've just learned about it. But it is, perhaps, the most radical idea ever learned by scientists, ever. And, so, we begin to find our way forward by recognizing that, our presence here, on this planet, within this galaxy, within this super cluster of galaxies - is dependent upon 13.7 billion years of energy expanding and growing increasingly complex over time. We are awakening in the midst of that...that's where we are. We are at the cutting edge of a 13.7 billion-year creative event.