

Skype with a Scientist: Dr. Harold Geller
(6th Grade) 9:30 am CT, Friday, October 25, 2019

- Have you seen any cases of extraterrestrial life?
- Have you found any extraterrestrial life?
- Have they had any results yet?
- Have you seen any creatures on any planets?
- Do they have any proof of life on other planets?
- What's the closest living source of life have you found on another planet?
- Do you think aliens are real?

We have not found any evidence of life on any planet in our Solar System; nor any planet orbiting any other star in the galaxy.

- How are astrobiologist able to measure the atmosphere of planets?
- How do you search for water in the atmosphere?
- What methods do you use?

In order to determine the presence of an atmosphere on any planet we use a technique called spectroscopy. It was first discovered by Sir Isaac Newton. It breaks up the light received from any object into a spectrum, something like a rainbow. By looking very closely at the spectrum, we can determine the existence of the chemicals which make up the object we are observing.

- Is there a chance of life on Mars?

There may be life on Mars; however, as of today, we have no evidence of life on Mars. We have not looked everywhere on Mars, so maybe we will find some life somewhere else on Mars.

- What would you picture life out there looking like?
- If there is life in space, would they have lungs?
- Would life in space have bones?

Life may look very different than what we have here on Earth. It will depend on the conditions that exist on the planet that we examine. Two colleagues of mine have just written a book called "Imagined Life" within which they provide their readers with many possible forms of life on the many different types of planets, in our Solar System and other star systems.

- What planets is it possible for people to live on?

There is only one planet we currently know in the galaxy where human beings can live; and, that is the planet Earth.

- What would we do if we find alien life?
- If we found life on a different planet, what would the procedures be?

There are procedures that have been established for anyone who claims to have discovered life elsewhere, whether in our Solar System or another star system. The two worldwide organizations to be contacted are the International Astronomical Union and the United Nations. There is a treaty in place that provides you with the proper procedures.

- Is there a way we can put life and water on other planets?

Yes there are many ways we can put life on other planets. It would require a lot of materials and a lot of money to get all the necessary materials to another surface. Think about what is needed when you go camping in the wilderness. It's a little like that; you need to take everything you will need to drink, eat, sleep, work, and even go to the bathroom.

- What if you find no other life in the universe?

Even if we do not discover any evidence of other life in this galaxy, we have learned much from the search and advanced the technology related to the instruments and computers that are needed to do such searches.

- What made you want to be a scientist?
- When you were a kid what did you want to be?

I am naturally curious and I have always been interested in understanding how things work. That natural curiosity has led me to engineering and science. While I was younger, I also had expressed interest in being policeman, fireman, teacher, lawyer, and even politician. I remember having an opportunity to meet John F. Kennedy when he was running for president.

- What did it take for you to get where you are?
- How many years did you go to college?

I am in the position I am because of many years of education and many years of experience in teaching and doing research. Many people are able to complete their doctorate degrees by time they are 26 years old, after 8 years of college. I had to

work while I was going to college and it took me closer to 30 years of college to get my four college degrees.

- Why did you choose astrobiology?

I was actually first a major in biology, or biochemistry to be precise. I always had an interest in astronomy since my parents took me to the Hayden Planetarium in New York City. After taking my first course in astronomy in college it seemed that astrobiology was a natural fit for me.

- Do you have to be a different scientist before you become an astrobiologist? Today, there are colleges at which you can major in astrobiology as an undergraduate. Years ago students going into astrobiology came from both biology and astronomy backgrounds.

- How long have you been doing astrobiology?

Well I guess you can say I have been studying astrobiology for over 40 years as I first got involved with astrobiology research using the data from the Viking mission to Mars. The Viking Landers sent back information from the surface of Mars between 1976 and 1982.

- What is so fun about your job?

What I enjoy most about my job is the ability to discover something new; and, then discuss it with other scientists, engineers, teachers, students, and the general public.

- If you had to pick another job, what would it be?

How about president of the United States.

- Do you go to space?
- If so, how many planets have you been to?

I have never been in outer space. But please remember that you don't have to go to outer space for look for signs of life elsewhere; sometimes, other planets come to you. There are meteorites, rocks fallen from the sky, that came to this planet from elsewhere. Most meteorites are the remains of asteroids or comets from space; however, there are a few that have come to Earth from the Moon and even Mars.

- Do you have to train to go to space?

Yes, you need special training to go into space. It takes close to two years in order to be certified by NASA to be an astronaut and go into space.

- Do you travel a lot?

I do not travel much at all now, but when I was most active in research and education, I did travel quite a bit, mostly to meetings and conferences of teachers and scientists. I recall that in the end I had over 300,000 air miles of travel.

- How many stars are there?

Actually that depends. There are about 400 billion individual stars in the Milky Way galaxy. There are about 200 billion galaxies in the universe. However, with our own eyes, without the aid of a telescope, you and I can only see about 3000 stars in the sky.

- Where do you live?

I personally live in a home in a town called Burke, Virginia. It is only about 6 miles from Fairfax, Virginia, which is the location of George Mason University.