



ASK A SPACE SCIENTIST

Our universe is full of mysteries, and some of the most mind-boggling are in space. Curious kids asked questions, and we sent them to two space scientists. Have questions about space? Send them to brilliant@usbnc.org (with your name and age).

How long does it take to become an astronaut, and how difficult is it to become one? – Nylah, age 11

Hi, Nylah,

To become an astronaut, you have to graduate from college and get at least three years of experience working in a field that's needed for a mission to space. The minimum age would be about 25. It's a good idea to have a degree in science, technology, engineering, math, or medicine. It would also be helpful to have one or two advanced degrees (master's or doctorate).

Once you've been selected to become an astronaut, it requires additional training to learn how to operate your spacecraft (space shuttle and/or Soyuz Russian spacecraft), how to operate the systems and subsystems on the International Space Station (ISS), how to perform spacewalks (Extra Vehicular Activities or EVAs), how to survive in case of a malfunction, and much more. This could take about two years. Once you complete this training, you're no longer an "astronaut candidate," but become a full-fledged "astronaut." You're ready to wait your turn for a mission. Once you're assigned to a specific mission, it could take another six months to a year to train for all the tasks you'll have to perform.

Here's a link to the International Space Station, so you can see what the astronauts in space are doing:
www.nasa.gov/mission_pages/station/main/index.html. –Charlie



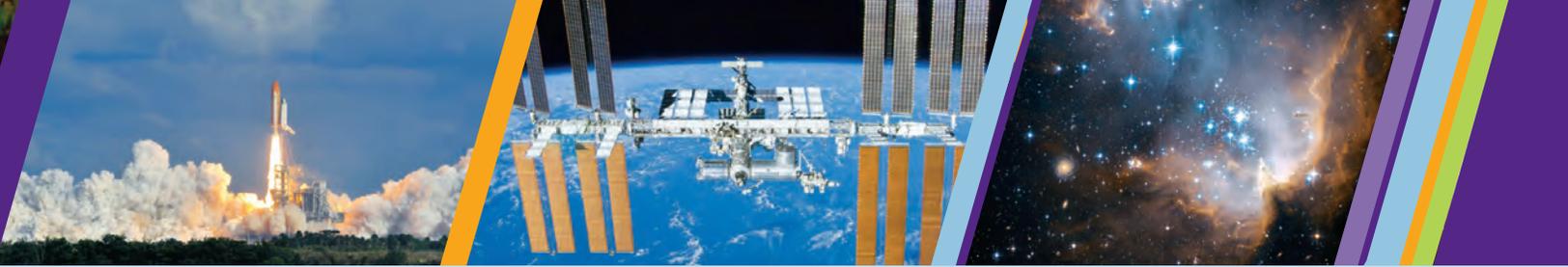
Charlie Camarda (right) working on the Space Shuttle Discovery in 2005, with commander Eileen Collins.

NOW ONLINE

Dr. Steve Scotti is excited to launch **Dr. Scotti's STEM Station**. You'll find fascinating info about Science, Technology, Engineering, and Math at www.brilliantstarmagazine.org/themes/DrScotti. In his interview on our website, Dr. Scotti says he often uses the Bahá'í principle of consultation in his work to make a _____ with a team:

- A) Decision
- B) Pizza
- C) Wish
- D) Model rocket





Are there other Big Bangs going on right now, or are there other universes? – Amia, age 14

Hi, Amia,

The idea of more than one universe has been around since at least 1704, when it was proposed by Isaac Newton. It's still under debate. The current consensus is that an early inflationary period after the Big Bang caused space itself to expand faster than the speed of light. So the part of the universe we see is much smaller than the entire universe, because light from objects over 47 billion light-years away can't reach us.



Light from some of these early galaxies took over 12 billion years to reach the telescope!

'Abdu'l-Bahá calls the universe limitless and states, "the luminous bodies of the material universe are infinite." If we can't observe the full extent of our own universe, we may never know about other universes.

Still, many physicists have theories. The current expansion of space-time is much slower than the expansion during the inflationary period, and we don't know why. Scientists call it dark energy. If we unlock the secrets of dark energy, it may allow us to probe farther into the universe than we can with light, and perhaps give us a hint as to whether there's more out there.

History shows there are things about the universe that we don't even know that we don't know—"unknown unknowns." You and I probably won't live to see evidence of another universe. But there are plenty of unsolved mysteries in our own cosmic backyard! – George



GEORGE HATCHER was an avionics engineer at the Kennedy Space Center in Florida, U.S., from 2004–2017. He worked on electrical systems of the space shuttle and uncrewed rockets. He also studied planetary science at the University of Central Florida. Working in avionics was a dream come true for George. He's aspired to be an astronaut since he was three. He's one of 100 finalists in the Mars One Project, which aims to create a human settlement on Mars.



CHARLIE CAMARDA is our guest contributor for this issue. He flew on the return-to-flight mission of Space Shuttle Discovery in 2005. He traveled 5.8 million miles during his two weeks in space. He's now the Senior Advisor for Engineering Development at NASA's Langley Research Center.

COSMIC QUIZ

What was special about the 2013 astronaut candidates?

- A) All were from California.
- B) Half had math degrees.
- C) They knew sign language.
- D) There were equal numbers of women and men.

