Understanding Aliens

What We Share in Common with Intelligent Beings Everywhere

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The vastness of the Universe is not possible for us to fully appreciated or imagine. Each of us is about a billion times bigger than an atom, which makes us sound huge. But the Earth we're on is about a billion times bigger than each one of us.[1] Big as that seems, it would take nearly 1.4 million Earths to fill the star we call our Sun. On a clear night, we can see about 8,000 other stars, those that are closest to us, amounting to only 0.00000004 percent of the estimated two-hundred-billion stars in our relatively small galaxy. But even those closest to us are so far away that we are seeing them as they were long before we were born. Look up at the Big Dipper tonight and you will see light that took as much as 150 years to reach your retina.

Traveling at the speed of light, roughly 180,000 miles per second, it would take about 100,000 years to cross the Milky Way galaxy that's containing all those stars, which is relatively small compared to other galaxies. It would take 220,000 years to cross Andromeda, for instance, our nearest galactic neighbor, so long as you don't mind the additional 2.5-million-year trip traveling at lightspeed to get there to begin with. The miniscule galactic neighborhood both the Milky Way and Andromeda are in, along with about 100,000 other galaxies, is named Laniakea, home to a hundred-million-billion stars. Yet Laniakea, the Hawaiian word for "immeasurable heaven," is only one supercluster of galaxies in the Known Universe. There are an estimated ten-million other superclusters, each containing hundreds of thousands of galaxies.

And the Known Universe refers only to what we have been able to detect so far, based upon the roughly 13.7-billion-year-old background radiation left over from the start of the Big Bang. Since the radiation is in all directions around us, seemingly putting us at the center of the Known Universe, it would take us 27.4 billion years to cross it traveling at the speed of light. If that is, you had a vessel fast enough to cross the Earth's diameter 22 times before you can say, "one-thousand-one," it would still take you more than 27 billion years to cross the length of the Known Universe.

Yet, as impossibly vast as this may sound, the Known Universe is to the entire Universe less than what the size of a quantum particle is to us. To say the Universe is very big, or even very, very, very, very big, is a gross understatement. I could not get at its vastness by filling an entire page with "very's," nor even an entire book, nor even an entire library of books filled with nothing but the word "very" over and over again, nor even all the books in all the libraries of the world. All those "very's," even if they were the only words ever written, would still underestimate the size of the Universe—so large that even traveling at lightspeed takes eons just to get beyond our own galaxy.

Given such incomprehensible vastness, the evidence of our own existence on Earth, and an understanding of mathematical probabilities, we cannot help but conclude there must be life, including intelligent life, elsewhere in the Universe. It is even reasonable to conclude there is an

abundance of life in the Universe, so much, in fact, that, statistically speaking, there are bound to be many planets and species similar to, if not exactly like, our own.

The closest Earth-like planet we know of is Proxima b, just outside our solar system, only 4.24 light years away. That's not far, if only we had a vessel that could travel 180,000 miles per second (186,000 to be exact). It was only in 1995 that astronomers discovered the first such exoplanet (meaning a planet outside our solar system), which is named 51 Pegasi b. Its discoverers got a Nobel Prize in 2019 because their detection techniques have since been used to help us discover more than 4,000 other exoplanets, with thousands more now waiting to be confirmed.[2]

In his 2021 book, *Extraterrestrial: The First Sign of Intelligent Life Beyond Earth*, Harvard theoretical physicist Avi Loeb says, "The Milky Way hosts tens of billions of Earth-size planets with surface temperatures similar to our own. Overall, about a quarter of our galaxy's two hundred billion stars are orbited by planets that are habitable in the way Earth is, with surface conditions that allow liquid water and the chemistry of life as we know it."[3] With an estimated fifty-billion habitable planets in our small galaxy alone, we must conclude the entire Universe is teaming with life, including beings as intelligent or even more so than our own. Loeb says, "Adding all other galaxies in the observable volume of the universe increases the number of habitable planets to a zetta, or 10^{21}—a figure greater than the number of grains of sand on all of the beaches on Earth."[4] And that, again, is just the number of such planets in the Known Universe, which is itself but a grain of sand compared to the rest of the Unknown Universe.

Perhaps the most astonishing claim in Loeb's book, however, is his explanation of an object observed moving across our solar system for about three weeks in October of 2017. "'Oumuamua," is the Hawaiian name given to the object, which means "a messenger from afar arriving first," or, simply, "scout." In this case, 'Oumuamua is the first interstellar object we've ever encountered in our solar system. Interstellar means it originated outside our solar system. Loeb makes a convincing case it is also the first proof of intelligent life in the Universe.

Despite the object being universally described as "weird," "mysterious," and "strange," most scientists have used Occam's razor to dismiss its unprecedentedly anomalous qualities. "At first, this detective story seemed like an open-and-shut case, the likeliest explanation for 'Oumuamua—that it was an interstellar comet or asteroid—was also the simplest, most familiar one," Loeb admits. "But as the fall of 2017 progressed, I, along with a significant portion of the international scientific community, found myself puzzling over the data. I—again, along with a significant portion of the international scientific community—couldn't make the evidence neatly fit the hypothesis that 'Oumuamua was an interstellar comet or asteroid. As all of us struggled to make the evidence fit that hypothesis, I began to formulate alternate hypotheses to explain 'Oumuamua's multiplying peculiarities."[5]

That it's the first interstellar object ever observed in our solar system is the first peculiarity and is what caused scientists and astronomers around the world to turn their telescopes on it for about

eleven days before it disappeared again into interstellar space. This is what allowed us to gather all the data about it that has helped us identify other peculiarities.

Take the way ‘Oumuamua reflected sunlight, for example: The data proves the strange visitor “had an extreme shape that was at least about five to ten times longer than it was wide …[6] Due to its relatively low temperature, as detected by infrared readings, Loeb says, “We estimated its length at about a hundred yards, or around the size of a football field, and its width at less than ten yards,” although “‘Oumuamua’s actual width could well be smaller.”[7] These extraordinary dimensions make it what astrophysicists call an “extreme” object, so extreme, in fact, there has never been any other object like it detected, including asteroids or comets. “With a length at least five to ten times greater than its width—allowed only two possible shapes,” Loeb says. “Our interstellar visitor was either elongated, like a cigar, or flat, like a pancake.”[8] Another physicist mentioned in his book has looked at the data and concluded “the likelihood of ‘Oumuamua being cigar-shaped was small and the likelihood of ‘Oumuamua being disk-shaped was about 91 percent.”[9]

Though small, ‘Oumuamua was also ten times more reflective than typical asteroids and comets. “When ‘Oumuamua sped part of the way around the Sun, its trajectory deviated from what was expected based on the Sun’s gravitational force alone. There was no obvious explanation for why.”[10] And it is this deviation that most convinces Loeb it could not have been an asteroid or comet, even one with many extreme qualities. So, cutting to the quick, what does he hypothesize this “messenger from afar arriving first” is? Based upon his explanation of the physics involved regarding all the data collected, and without going into all his complicated math, Loeb says, “‘Oumuamua must have been designed, built, and launched by an extraterrestrial intelligence,”[11] possibly “floating in interstellar space as debris from advanced technological equipment.”[12] From here, you’ll have to read the book yourself to find out if you find Loeb’s arguments and evidence as convincing as I do.

The point in all I’ve said so far is really meant to open us not merely to the possibility of intelligent life elsewhere in the Universe, but to the almost certain likelihood of it, and, if Loeb is right, to our own inevitable discovery of and encounter with it. There are many forms of intelligent life on Earth. Almost every creature on it demonstrates some intelligence. So, to be clear, when I refer to intelligent life in the universe, I mean that which might be comparable to human intelligence, with a strong degree of self-awareness and the ability to extend one’s powers through the use of tools and technologies. There are likely to be beings in the Universe that are far more intelligent that we are, especially if they have achieved the ability to travel meaningful distances across space. We have already established the Universe is too vast for any species to travel through it, even at the speed of light, without taking eons to get very far.

If there are intelligent beings in Andromeda, our nearest galactic neighbor, who have developed vessels that can travel exactly 186,000 miles per second, light speed, it would still take them 2.5 million years to visit Earth. They could make it in less than 1.3 million years if they have figured out how to travel at double the speed of light, which is still a very long time. My point is, achieving

contact with such beings by moving through linear space is impossible, not unless they dwell somewhere just beyond our own solar system, can travel at the speed of light, and don't mind taking a few years to decades to get here. Space travel, if we can even call it that, across the Universe, would require an understanding of quantum mechanics that allows them to get from place to place without moving through space, but, perhaps through wormholes, folds in spacetime, time travel, or dematerializing machines that enable them to rematerialize anywhere by taking advantage of quantum entanglement, Einstein's "spooky action at a distance."

If there are species that can do so, they are far superior to us in intelligence and may consider us about as intelligent as we consider chimpanzees compared to ourselves, or about as smart as our domesticated dogs and cats. Then again, it could be that we could easily understand such technology if they explain to us how it works, since we understand basic physics, which would still make us relatively equal in intelligence, give or take a few neurons or folds in the neocortex. But, for now, let's just assume the Universe is littered with intelligent beings like us or even smarter than us, but that we will never make contact with them because meaningful space travel is impossible. If this is the case, is there anything we can know about them, anything we can conclude must be true about all intelligent beings?

It would be impossible to know if all intelligent species are religious, or, at least, have gone through religious phases of their development. If we have, certainly some of them have, even if some have not. But we can be sure none of them ever heard of Christianity, or Islam, or Judaism, or Buddhism, or any other of the religions so many of us have been willing to kill and die for, or feel certain hold the key to ultimate truth. There probably wouldn't be any Republican or Democrat aliens, even if some of them do engage in their own kind of politics. We can't even know if all intelligent beings have feelings. It's likely they all have bodies of some kind, but do they share the same primary emotions we have—joy, anger, sadness, fear, disgust, and surprise? Some probably do, but some may not. Some, cold blooded aliens, may have developed large cerebral cortexes without ever having developed much of a limbic system. We can't be sure if they live in oceans or in their atmospheres, rather than on land, or if they have arms and legs, or eyes and ears, or all, some, none of, or more than the senses we have. If the Universe is littered with intelligent beings, there are probably some a lot like us, and some too different to even imagine.

But what we must share in common in order to be intelligent is an understanding of certain universal truths. All other intelligent beings that are at least as smart as us and can extend or augment their abilities through the use of tools and technology, must understand complex math, science, physics, logic, and probably music, even if the latter is experienced differently than ours, perhaps through touch, or light fluctuations, or elegant thoughts. Maybe some aliens smell music. However they experience it, given the relationship between math and music, and the necessity for intelligent beings to understand math, it seems likely music is also a near universal experience —"the music of the spheres," as the ancient mathematician Pythagoras, the discoverer of octaves, called it.

So, that's about it, the only things we can assume we must share in common with other intelligent beings is our knowledge of mathematics, science, physics, logic, music, and the use of tools and technology. It is not necessary that all intelligent beings are biological, although all of them probably began as such. Some species, more advanced than our own, may have evolved into intelligent machines and some may now enjoy a digital existence stored in quantum fields or in the fabric of space. Given where computer science is even now, these ideas aren't farfetched.

But another thing we share in common with all other intelligent beings in the Universe, no matter how much more intelligent than us they might be, or how different, is that we are all from the same Universe. Everything and every being that exists in the Universe today comes from stardust originating during the Big Bang. Every being that is alive anywhere in the cosmos is related. We are all kin. No matter how different, how alien we might seem, we are all part of one cosmic family because we are all related, we all come from the same source and are made of the same stuff.

It is even possible the DNA shared by all life on Earth originated elsewhere in the Universe and arrived here, like all the water on the planet did, on asteroids. This is an idea that is ancient but is now being seriously entertained by some scientists. *Directed panspermia* is the name of this theory, which I won't go into, but that was first coined by Francis Crick, one of the discoverers of DNA. It helps explain how the Earth, which was uninhabitable its first 3.8 billion years, was able to produce life only 200,000 years later. How could DNA have evolved so quickly and become life? Directed panspermia helps solve this riddle and, if true, would mean our DNA may be exactly the same as the DNA of at least some other beings elsewhere in the Universe.

And here's the real point of all of this, if we are but one intelligent species among many, at home, alone, on our very own "pale blue dot," as Carl Sagan called it—"a mote of dust suspended in a sunbeam"—how is it possible, during our brief history together, that we have drawn so many lines between ourselves based upon the slightest of differences? Language, tribe, nation, neighborhood, ideology, theology, gender, pigment, sexuality, class, politics, identity—how can these make us think we are so different from our brothers and sisters that we can hate them, exploit them, kill them? "The Earth is a very small stage in a vast cosmic arena," Sagan says, "Think of the rivers of blood spilled by all those generals and emperors so that, in glory and triumph, they could become the momentary masters of a fraction of a dot. Think of the endless cruelties visited by the inhabitants of one corner of this pixel on the scarcely distinguishable inhabitants of some other corner, how frequent their misunderstandings, how eager they are to kill one another, how fervent their hatreds."

There's a common theme in science fiction stories, that if humanity were to be invaded by beings from another world, we would forget all these differences and finally ban together to defeat our common enemy. Alas, I think this is but the stuff of science fiction. Why would we expect a common enemy to bring us together when we already have so much else in common, including climate change, a common enemy which has become only one more dividing line between us?

The solution, rather, is not creating a common enemy, which is the cause dictators and despots have used for centuries to further divide us, but to better appreciate or common humanity. We must fulfill and further Dr. King's dream, "that one day little black boys and girls will be holding hands with little white boys and girls." Today we must dream even bigger to also include little gay boys and girls, little Russian and Ukrainian boys and girls, little wealthy and homeless boys and girls, little Texan and Mexican boys and girls, little liberal and conservative boys and girls." If, in this vast Universe there is no such thing as an alien because we are all related, all born and fashioned from the same stuff, how can we consider anyone on Earth an alien, a foreigner, homeless? How can we exile and excommunicate each other because of our slight differences? How can we erect ideological purity codes when as Salman Rushdie says, we should rejoice in "mongrelization" and fear "the absolutism of the Pure."[13] How can we keep singing our national anthems and "My Countries 'tis of Thee's," when we should be singing "Come, Come, Whoever You Are … This Land is My Land, This Land is Your Land, This Land was Made for You and Me … This World is My World, This World is Your World, This World was Made for You and Me."

"There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world," Sagan said. "To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known."

[1] Gott, J. Richard & Vanderbei, Robert J., *Sizing Up the Universe*, National Geographic Society, Washington, DC., 2011, p. 190.

[2] Loeb, Avi. *Extraterrestrial* (pp. 137-138). HarperCollins. Kindle Edition.

[3] Ibid., p. 50)

[4] Ibid.

[5] Ibid., p. 27.

[6] Ibid., p. 29.

[7] Ibid., p. 30.

[8] Ibid., p. 30f.

[9] Ibid., p. 44.

[10] Ibid., p. 33.

[11] Ibid., p. 65.

[12] Ibid., p. 66.

[13] *Imaginary Homelands* (1992)