In a recent Q&A forum about my book *Extraterrestrial*, I confessed that I search for signs of intelligent civilizations in the sky since I do not find them on Earth. An audience member chuckled and asked: “how do you define an intelligent civilization?”

In my book, an intelligent culture is guided by the trademarks of science, namely: promoting a prosperous future through cooperation and sharing of evidence-based knowledge. Daily news reports indicate that humans do not follow these principles very often. We tend to fight with each other, favor prejudice over evidence and seek ways to feel superior relative to other people. The last tendency is the source of all evil throughout human history, as it results in phenomena such as elitism, supremacism, nationalism, racism, antisemitism, genocide and wars.

And speaking about the harm caused by wars, in 1939 Winston Churchill wrote an essay on the exciting prospects of the search for alien life but had no time to publish it because he was asked to serve as the Prime minister of the United Kingdom in its fight against the Nazi regime. Driven by racism and antisemitism, the Second World War wasted 4 trillion dollars for the US alone and 75 million human lives – about 3% of the world population at that time. The human loss included a genocide of 6 million Jews – about two-thirds of Europe’s Jewish population. My grandfather’s family resided for seven centuries in Germany prior to the War, and their only remainder now is a street named after him - the “Albert Loeb Weg” in his birth town. If the lost resources and lives were dedicated to Churchill’s original vision instead of being wrongfully wasted, we could have known by now whether there are smarter kids on our cosmic block. This alternate history would have signaled intelligence at our end and could have cemented Churchill’s legacy as a thought leader rather than a political leader. But instead, an alien species watching us during the Second World War, would have concluded that we have a long way to go before gaining Galactic-scale respect as an intelligent species.

The opposite of war is cooperation, best exemplified by the scientific culture. When embarking on a trip anywhere around the globe as a practicing scientist, I have the privilege of meeting numerous other scientists with common interests. Sharing knowledge makes science “an infinite-sum game”, out of which everyone benefits through cooperation. If medical records in China were shared more openly during the early days of the COVID-19 pandemic, vaccines could have been developed earlier, saving more human lives. Science offers a global solution to our global problems through cooperation on the one planet that we all share.

The remarkable success of science and technology in developing the COVID-19 vaccines is not celebrated enough. Currently, more than 99% of all COVID-19 hospitalizations in the US...
involve patients who were not fully vaccinated. This fact alone underscores the triumph of medical science and technology in shielding us from the pandemic. The effective messenger RNA vaccine did not follow the traditional approach of using a weakened virus but rather employed a synthetic chemical to achieve the needed immune response.

The application of scientific knowledge to a practical use, as in the case of the COVID-19 vaccines, often stems from many years of blue-sky research which aims to merely garner a better understanding of the fundamental principles. Another important essay written in 1939 was by Abraham Flexner, the founding director of the Institute for Advanced Study in Princeton, who helped bring to the United States many Jewish scientists from Europe who would have suffered persecution by the rising Nazi government - including Albert Einstein. As a result of the War, Germany lost its world leadership in science. Flexner's essay titled: “The Usefulness of Useless Knowledge”, describes how curiosity-driven research with no concern for applications leads to some of the most revolutionary technological breakthroughs. The time lag between scientific discoveries and their practical use can be long. When Albert Einstein developed the General Theory of Relativity in 1915, he thought mostly about its application to the solar system (precession of Mercury and deflection of light by the Sun) and the cosmos, but never imagined its crucial role in enabling the precision required for Global Positioning Systems a century later. Similarly, the originators of quantum mechanics did not imagine its numerous applications in electronic devices and computers.

Science is the torch that will continue to light our path as we move forward through the darkness. We can get a glimpse at our future by finding technological signatures of extraterrestrial civilizations that had more time to develop their science simply because their host stars formed before the Sun. This search for both biological-signatures of microbial life and technological-signatures of intelligent life is thoroughly reviewed in a new textbook that I wrote in collaboration with my former postdoc, Manasvi Lingam, titled “Life In the Cosmos”, to be published by Harvard University Press on June 29, 2021. If Churchill was alive, I would have sent him a gift copy of this textbook with a dedicated inscription - in gratitude for his 1939 foresight.

Here’s hoping for a better future of humanity, guided by science and not conflict. The scientific knowledge that distant extraterrestrial intelligences exist might seem useless at first glance, but it could have the major practical benefit of motivating our civilization to get its act together and avoid wars, as envisioned in the United-States-President Ronald Reagan’s 1987 address to the United Nations. If we follow the scientific principles of cooperation in pursuit of evidence-based knowledge, we will demonstrate to alien civilizations that there is an intelligent species on Earth worthy of their attention. Perhaps then it will become clear why they had been ignoring us for so long. Fermi’s paradox will be resolved by an acknowledgement on their side that our actions are finally intelligent. A wiser behavior at our end might earn us an honorable place in the club of intelligent galactic civilizations for the first time in human history.
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