

Astrobiology News December 2021: Looking Back on 2021

As another difficult year comes to a close, I'd like to offer just a few thoughts and resources relating to some scientific accomplishments in 2021. Beyond astrobiology proper, there have been many achievements that are significant to life on our planet. Of course, foremost among them is the development and widespread distribution (at least in the U.S.) of effective COVID-19 vaccines; however, there have also been notable achievements in the space sciences that have either direct or indirect implications for life on Earth.

NASA accomplishments include the successful landing of the Mars Perseverance rover¹ in February, which marked a new stage in the search for ancient life on Mars; the successful flight of the Mars Helicopter, Ingenuity,² which was the first demonstration of controlled flight on another world; and, just last month, the launch of the Double Asteroid Redirection Test (DART) mission³, the world's first full-scale mission to test technology for defending Earth against potential asteroid or comet hazards. DART is traveling to a non-threatening binary asteroid system (Didymos) to slam into the smaller of the two (Dimorphos) in fall 2022, in order to study the effectiveness of impact as a reliable method for deflecting asteroids. The result of DART's impact within the binary system can be measured much more easily than a change in the orbit of a single asteroid around the Sun. Several of my colleagues at the Planetary Science Institute are on the team of this important mission that will attempt to change an asteroid's motion in a way that can be accurately measured using ground-based telescopes, and will improve computer models that are essential to predicting the effectiveness of this "kinetic impactor" technique.⁴

As some of you know, the Center for Advanced Study in Religion and Science (CASIRAS), which supports the Clergy Letter Project, has been offering a series of free webinars on topics of interest in science and religion. This year, we've been fortunate to have had three speakers who are all recipients of the Carl Sagan Medal for Excellence in Public Communication in Planetary Science: Dr. David Grinspoon, Br./Dr. Guy Consolmagno, and Dr. Heidi Hammel. Presentations have explored topics from the future of life on Earth, to the "size" of God, to observing the birth of galaxies in the early Universe and the anticipated launch of the James Webb Space Telescope on December 22. If you missed any of these, I encourage you to visit the CASIRAS website for links to the archived presentations!⁵

If you've been following my descriptions of people-powered research on the *Zooniverse* platform, you might be interested to know that for the third consecutive year, *Zooniverse* has published a book with this year's project highlights.⁶ You can download a free pdf of the book or purchase a paper copy on the *Zooniverse* website. Expect to hear more from me about efforts to expand the community of people-powered researchers in the New Year!

¹ <https://mars.nasa.gov/mars2020/>

² <https://mars.nasa.gov/technology/helicopter/>

³ <https://www.nasa.gov/planetarydefense/dart>

⁴ <https://www.psi.edu/news/DARTlaunch>

⁵ <https://www.casiras.org/>

⁶ <https://www.zooniverse.org/about/highlights>

Finally, many people wonder about the practical benefits of space exploration. I encourage you to check out this year's NASA Spinoff 2021 publication⁷ and brochure,⁸ which highlight many practical applications of technology developed for aerospace. Among them you can read about how research on resilient materials for supersonic airplanes helped to create a new kind of polymer that caught the eye of a medical technology company, which is trying it out in more durable medical implants. That caught MY eye, since I'm having a total hip replacement this month, the day after achieving the milestone age mentioned in the title of that famous song recorded by the Beatles in 1967...

Until next month,

Grace

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⁷ https://spinoff.nasa.gov/sites/default/files/2020-12/NASA_Spinoff-2021.pdf

⁸ <https://spinoff.nasa.gov/sites/default/files/2020-12/NASA%20Spinoff%202021%20Brochure.pdf>