ET: Check your voicemail

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Joe Davis ascends a walkway to the transmission dome suspended 500 feet above the Arecibo radiotelescope dish in Puerto Rico, in preparation for his transmission of a message to alien beings. Photo: Ashley Clark

(PhysOrg.com) -- Alien beings on faraway planets may not have noticed, but it's been 35 years since human beings made the first deliberate effort to send them a message.

In 1974, astronomers Carl Sagan and Frank Drake, both working at Cornell University, used the world's biggest and most powerful radio telescope to transmit a one-of-a-kind three-minute message. It consisted of 1,679 bits — ones and zeroes — and was cleverly designed to produce a simple image revealing something about humans' size and shape, our

solar system, the dish that sent the message, and even the biochemistry of our bodies.

Joe Davis, a research affiliate in MIT's biology department and a former artist-in-residence at MIT's Center for Advanced Visual Studies, decided that the Earth's first broadcast to aliens was an event worth commemorating, and set out to find an appropriate way of marking the occasion.

Earlier this month, a few days before the message's Nov. 16 anniversary, he beamed a new message from the same telescope, the Arecibo dish in Puerto Rico — using his iPhone as an improvised source to get the new coded message modulated into the 1,000-foot-wide dish's two-million-watt radio beam.

The iPhone wasn't part of the original plan, but when Davis arrived at the radio telescope site, the director there told him that the encoder normally used to modulate the powerful beam was out of commission. He suggested that Davis postpone the transmission. Fearing that he might not get another chance, Davis and a friend worked through the night to create an alternative method. They came up with a workaround using the iPhone's audio-recording capability and some scrounged connector cables.

Afterward, Ann Druyan, Sagan's widow, read about Davis' transmission and sent him a note thanking him for commemorating the 1974 message, "and especially for doing it with such flair." She added, "I know Carl would have loved the iPhone story. (As did I.)"

For the message, Davis chose to represent RuBisCO (short for ribulose-1,5-bisphosphate carboxylase oxygenase), which may be the most common protein molecule in all of Earth's myriad life forms. Not only is RuBisCO a ubiquitous biomolecule, Davis explains, it's also a key to

living beings' very survival, since it's a basis for photosynthesis, the energy source for nearly all terrestrial life forms.

The targets were carefully chosen, too — three nearby stars, ranging from 12 to 30 light years away, that are similar to our sun. So, since radio waves travel at the speed of light, it wil take 12 to 30 years for the message to reach its destinations. In contrast to the target of the Sagan-Drake transmission — a star cluster 25,000 light years away that will have moved far from its original location by the time the beam gets there, and therefore will never get the message — these stars will still be there when the radio waves arrive.

Davis calls the project "Rubisco Stars." His detailed report of the process of getting his message beamed out to the three nearby stars has already been posted on several science blogs (including Centauri Dreams).

The message, like its predecessor 35 years ago, is really aimed more at earthlings than at aliens, whose chances of receiving the message, let alone interpreting it, are vanishingly small. The real idea is to get people thinking about what it would mean to converse with beings whose nature and environment are far beyond our imagination. As Davis points out, "there are intelligent beings on Earth we can't communicate with."

In that sense, this is, like most of Davis' work, a blend of science and art. For a project in the 1980s, for example, he arranged with NASA to create an artistic piece from the space shuttle's payload bay. The project would have used a high-powered electron gun to produce an artificial aurora, but it was one of many payloads canceled after the Challenger disaster in 1986.

In recent years, Davis has worked with the tools of genetic engineering to embed tiny artworks inside the genomes of microbes — creating

sequences of DNA bases that can, with an appropriate translation scheme, be decoded into a series of binary numbers that, arranged in a grid, form simple line drawings. He has also produced “DNA prayer flags,” colorful Tibetan-style patchwork designs decorated with the genetic codes (in standard ACGT notation) of known disease markers on the human genome. The flags have been displayed by people all over the globe (at least three Nobel laureates among them), and are, Davis says, “kind of a cool connection between religion and molecular genetics that nobody can really argue with.”

The prayer flags are not Davis’ only attempt to meld science, art and religion. In the biology labs of MIT professor emeritus Alexander Rich, where Davis often works on his projects, there are jars containing the parts of disassembled clocks, immersed in water. Davis says, wryly, that if the molecules that form the basis of life could have spontaneously self-assembled in Earth’s primordial seas, as most biologists believe, why couldn’t a clock — a much simpler system — also spontaneously assemble itself? The jars have been sitting there for a few years. So far, Davis says, he’s seen no signs of self-assembly.

Davis moved from the Center for Advanced Visual Studies to the biology department in 1986. He had been discussing some of his ideas for microbial art with Rich when, as Davis describes it, Rich asked him, “What are they paying you over there?” “Nothing,” Davis replied. Rich immediately said, “I’ll match it!” Davis has been working in the biology department ever since.

While much of his work is microscopic, transient or inscrutable, perhaps his most visible creation was a large stainless-steel globe surrounded by steam jets. This work is located prominently in Kendall Square in Cambridge, Mass., next to the MIT campus.

But the microbial artworks — though they’re invisible to the eye, and

though their jars have only once been publicly displayed outside Rich's lab in building 68 — are self-reproducing. And therefore, Davis explains with a grin, they've become the most-reproduced artworks in the world, with billions of copies.

"I'm probably the most successful publisher in history," Davis told a writer for Scientific American a few years ago, referring to his exponentially reproducing microbial art. And now, with Rubisco Stars, he may also be responsible for the most widely disseminated artwork ever produced on Earth — even if nobody ever sees it.

Besides, he adds, he now owns what he calls the world's coolest phone. "Who knows who's going to be calling back?"

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