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Other worlds

Caltech's Robert Hurt and Tim Pyle combine science and art to bring the universe to life

By Kevin Uhrich

THE MIND'S EYES: Dr. Robert Hurt of the Spitzer Science Center.

hat would conditions be like on a world with two suns? Or here in our one-star solar system, could life develop on a planet like Jupiter, which is

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covered with lighter-than-air hydrogen? And, in these days of growing concerns about comets destroying Earth, what actual damage would be caused by planets colliding?

Unlike most of us who can only dream about the many wonders of the universe, astronomer Dr. Robert Hurt's job is to pump life into those and other visions of the galaxy by illustrating them for both the scientific community and the public.

“That's the name of the game with our artist's concepts,” said Hurt of his task of taking reams of mind-numbing data and, with the help of Spitzer Science Center artist Tim Pyle, translating them into images that people can't pry their eyes from.

“The problem is if you show just the data sets, people don't get that excited. This is what it looks like coming from a microscopic observation of the stars,” Hurt said, opening up a computer screen diagram full of data that took a few moments for a layman to figure out.

“I can take 10 minutes to explain what we're doing here and how exciting it is that we have seen some features of chemicals in the atmosphere, but that's not going to grab anyone's attention.

“We will try to come up with an artist's concept that's trying to convey these ideas, but we want to capture people's imagination with it. We want their eye to stop, linger and put enough into that image that they're curious enough to know why we are showing this weird, glowing planet,” Hurt said. “They'll stop to take a look and actually read the article and find out what's going on.”

Spitzer Science Center announcements, or press releases, are written by Jet Propulsion Laboratory media specialist Whitney Clavin, and much of the actual artwork produced by the center, part of NASA's Infrared Processing and Analysis Center (IPAC), is done by Pyle, who's a great artist, but not a scientist. So it helps to have someone who understands astronomy overseeing the artwork, much “the same way you want someone who understands science writing the text,” Hurt explained during a recent interview in his second floor office at the Spitzer Science Center on the Caltech campus.

Space Age art

With shows like the History Channel's “The Universe” featuring Hurt and any number of Caltech and JPL scientists commenting on all things related to space, and “Mega Disasters,” which relies heavily on images of catastrophic what-if scenarios, the demand for not only expert opinions but also astronomical art like that produced by Hurt and Pyle has probably never been higher.

But whether it's merely by virtue of the public catching up with the science or science rightly taking center stage in these times of global warming and imminent Earth-meltdown, Hurt, an astronomer and visualization specialist with the Spitzer Science Center, and Pyle sit at the center of something of a renaissance of an art form that started nearly 60 years ago and helped fuel imaginations at the start of America's Space Age.

Astronomical art was pioneered in the 1940s by Chesley Bonestell, who, according to a number of online biographies, was fascinated with space travel and sought out the best expert opinions to inform his paintings. It's said that his work actually first inspired space travel, which seemed impossible in the days prior to the Nazi V-2 rockets, developed at the end of World War II and launched against England.

Hurt certainly credits Bonestell's detailed paintings with stoking his passion for astronomical art, and to some extent his intense interest in science. But other artists of note followed over the decades, the two most prominent being Don Dixon — perhaps best known for his art of dinosaurs suffering through comet storms and other galactic catastrophes that scientists believe spelled their extinction — and Don Davis.

(Check out Davis' work at www.donaldedavis.com and Dixon's at cosmographica.com/gallery/index_main.html.)

In its infancy, this type of art found a nursery in magazines like Fantasy and Science Fiction, Amazing, Astounding (later renamed Analog) and Galaxy. Today, says the online encyclopedia Wikipedia, astronomical art appears mostly in magazines like Sky and Telescope, The Planetary Report and Scientific American.

“I was really inspired growing up looking at the works of Bonestell, where you would sit down with the best science that you had on hand and then try to fill in the gaps and try to give it that aesthetic experience, which was always as clear as the understanding of the times, as opposed to just being completely fantastic, like the pulps in the '50s and '60s, with all these wild, fantastic alien worlds,” said the 43-year-old Hurt, a native of North Carolina.

Largely self-taught, Hurt has no academic art background. “I was doing astronomical art in high school,” he recalled. “I had a very tolerant art teacher in high school who realized that I was not that thrilled with figure drawing, but she gave me nice chunks of time … for painting stars and galaxies.”

But art, Hurt said, was always something he did on the side while attending the University of North Carolina at Chapel Hill. After getting into post-graduate work at Caltech, Hurt had less and less opportunity to do artwork, mainly because it was too time-consuming to break out his airbrush and acrylic paints and then clean everything up afterward.

“Then I discovered Photoshop and that was really fast; no paint on the carpet or anything like that,” he said with a chuckle.

What goes up …

A few years later, Hurt was brought on as an astronomer with a project to create the first ground-based high-resolution digital map of the sky, the Two Micron All Sky Survey, or 2MASS. Hurt worked with the project's quality assurance team for about three years, but as a side interest he started looking at some of the images and data and pondered ways to make all of that even

more expressive and appealing. At that point, “I took it up the next notch,” Hurt said.

Even while attending Chapel Hill, Hurt said, he always found more pleasure in putting images together than writing. “With words I was horrible, but I was always trying to push the limits on what we knew about making color composites, and how we could use color to decode information, trying to find the most effective ways of taking these data sets and rendering them in color to make them more useful, so it's been that kind of passion that's been driving me all along,” he said.

The problem was that visualizing images from the sky-mapping project wasn't really his job. Soon, however, the lead investigator on the project saw his work and said he wanted to see more. By the time the Spitzer Space Telescope project was gearing up, Hurt said he knew a press office would be set up and someone would be chosen to handle the visuals. “Once this position was conceived, it was pretty much handed to me,” he said of his transition to the Spitzer Science Center in 2002.

One episode of “The Universe” on The History Channel features one of Hurt's more fantastic creations: a being that floats like a balloon and feeds off hydrogen and helium from the gaseous surface of Jupiter, the image featured on this week's cover.

Hurt, who was commissioned by The History Channel to do the artwork, said the idea for such a creature dates back to the '70s and was really first conceived by Carl Sagan. When asked for an opinion about the Jupiter balloon plant, Hurt decided that “there was a kind of a twist I had to put into that.”

The central idea of the creature being a balloon was in the original concept. But balloons only float because they are filled with gas that is lighter than their surroundings. Nothing is lighter than hydrogen, leaving nothing to lift the imaginary being.

“The only unique thing I brought to it was that if this was going to be a floating balloon creature on an alien world, it was going to have to be a hot-air balloon. It couldn't fill itself with light gas because it's floating in the lightest gas,” Hurt said. “I sort of went down a thread of something that was like a plant that had a really dark photosynthetic surface and that would warm its internal gases when it was day.”

Then, since it's night on Jupiter half the time, the creature would naturally sink as temperatures dropped. But the other thing about Jupiter is its powerful thermal updrafts, and Hurt said he believed the creature would have to have a shape that was conducive to easily ride those winds.

“I sort of sketched out a shape that I thought would have some ability in lifting properly in an updraft,” he explained.

And thus, a possible life form on Jupiter — at least in the minds of Hurt and anyone watching “The Universe” on The History Channel — was born. Or, more accurately, visualized.

‘Space Bees'

Pyle, who puts together illustrations and animation for Spitzer Internet pod casts “Ask an Astonomer” and “Ask an Infrared Astronomer,” became involved with Caltech and the Spitzer Science Center largely through chance.

The 37-year-old California native and aspiring filmmaker said he attended TV radio and video classes at Cal State Northridge. Much like Hurt, Pyle also had no formal training in art; just a love of space that developed as a child while growing up in Sacramento and peering into an old telescope at night with his father.

But if without an education in art and science, Pyle had talent and luck on his side. For a time, he worked for a Burbank company that did production work and was allowed to get in some experience as an animator. Then, about three years ago, while doing computer generated graphics for a motion picture studio, he answered an ad in entertainment industry trade papers and got the job with Spitzer.

“I guess my timing has been very lucky, it was kind of a fluke that I got it” said Pyle, who has created a number of engaging cartoon characters for Science Center sites.

But Pyle's first love is filmmaking, and last weekend a screenplay that he wrote, “Will Bender's Feature Attraction,” won an honorable mention at the Big Bear Film Festival. Another of his productions, a film called “Decaying Orbit” that utilizes some of what he's learned while working at Spitzer, is up for top honors in two weeks at a film festival near Modesto. In fact, it was one of Pyle's two-minute animations, “Space Bees,” that ultimately won him the job at Spitzer.

“I'm a layman. I have no idea what the science is behind these stories. So whenever we have a press release, Robert Hurt and Whitney Clavin, our science writer, will explain it to me and what is cool about it … and it actually is. There is just some really cool stuff in the science that we do,” Pyle said.

“I love the fact that I am actually able to help explain to the general public — explain to people like me —just what is so cool about these things,” he said.

Dream job

It would seem that Mars, a planet where NASA scientists are actively trying to find some form of life, would provide a fertile field for an imagination like Hurt's.

“The exciting results coming in from the Mars Rovers have made a very powerful case that water in its liquid form has existed even relatively recently in geological terms, and the question is if you have the liquid water is life something that happens naturally or is it something that's very rare?” Hurt said.

“If life is a process that's relatively straightforward and abundant when you get the right conditions, yeah, there certainly are some interesting possibilities that life has existed and may really be

there," he said. But as for visualizing those possibilities, NASA apparently has other plans. And again, that's not really Hurt's job.

"I haven't done any work for the Mars missions. And they've really been focusing more on the water presence, not really talking so much about extrapolating the presence of life. That's guesswork at this point," he said.

The Spitzer Space Telescope, however, is a different story. Hurt said the past year's work on that project became especially exciting after it was learned the telescope could identify properties of worlds orbiting stars outside of our solar system.

"Even though we can't take a picture of these planets, we can actually piece together what their atmosphere is like in infrared around all sides, and now we are literally able to understand the weather patterns on these worlds. We know what their temperatures are. We know their wind patterns, at least in a very coarse manner."

Also recently, the Spitzer telescope made another astounding discovery: There is enough water vapor — the essence of life — inside the collapsing nest of a forming star system to fill the oceans on Earth five times over.

All of these images have since been visualized and translated into numerous works of art featured on the Spitzer Web site, www.spitzer.caltech.edu.

Hurt said he and Pyle have been documenting changes in the numerous renditions of the planets scientists have found outside of our solar system and are, as he says, "writing the book as time goes on."

It's been said that journalism is actually the world's best job because it puts reporters in the front row of history as it happens. Pyle and Hurt are writing and illustrating the possible history of the universe, and Hurt believes his is "probably the neatest job on the planet … Talk about getting your dream job. I count myself fortunate every week."