



Q&A: The space entrepreneur

After completing simultaneous doctorates in physics and chemistry, **Harry Kloor** became a space-exploration consultant and film-maker. As his three-dimensional animated feature *Quantum Quest* — made with real footage from the Cassini spacecraft — is previewed in New York, Kloor shares his thoughts on manned space flight and the use of prizes to motivate adventurous science.

How did you become interested in science?

Through science fiction and watching the Apollo Moon landings. As a child I had a lot of time to explore the Universe through books because I was born partially crippled with my legs backwards. The doctors said that I would spend my life in braces and would never be able to run. My parents told me not to let those ideas limit me, and by the age of seven I ran for the first time. Overcoming that first hurdle showed me that experts often close their minds to possibilities.

How did the idea for the movie arise?

The genesis was from my science outreach work at Purdue University, where I collaborated with Marvel Entertainment and Paramount Pictures to make posters to promote science education using Spider-Man and *Star Trek*. In 1997, NASA wanted me to make a documentary to promote its Cassini and Huygens missions. But I came back with a different idea: an animated movie in which science concepts come to life.

What does the film teach?

It covers a host of physics concepts and real space discoveries. We travel over three-dimensional recreations of the surfaces of Mercury, Venus, Mars and the moons of Saturn, ending with a grand tour of its largest moon, Titan, based on the Cassini and Huygens radar and visual data. We have characters representing matter and antimatter. Actor Chris Pine is a photon, Amanda Peet is a neutrino, Hayden Christensen and Doug Jones are solar-surfing protons. We also have characters to represent fear and ignorance, things that keep you from learning.

Why did *Quantum Quest* take more than a decade to complete?

I knew from the start that it would be a long haul, because the radar data we needed to create the surface images of Titan would not arrive until 2008. Naively, I had recorded the script in 1997, not realizing that new discoveries would require a complete rewrite. Just like when you launch a spacecraft, there was a long gap of time in which nothing



Quantum Quest charts the Solar System journey of Dave the photon, helped by The Core of the Sun.

happened on the film. Then in October 2007 the project came out of hibernation. I rewrote the script and recorded it with the voices of a new cast that includes actors Samuel L. Jackson and Mark Hamill, as well as astronaut Neil Armstrong.

You have been an adviser to NASA and private space firms for 20 years. What do you think of US President Barack Obama's agenda for manned space exploration?

We can't predict what we will find on other planets, so until we have Terminator-like robots who can do everything we could do, a human presence is good for science. I think we should be going to Mars and doing it faster than currently scheduled, using a mix of public and private funding.

You were chief science adviser on the \$10-million X PRIZE for suborbital flight. Are there drawbacks to stimulating scientific research with cash prizes?

I don't think prizes work for everything. But where they do work, they can serve as a massive multiplier. The X PRIZE Foundation doesn't put up the research funds for the contests; that comes from private, non-governmental sources. They just put up

the prize money and say, 'try to tackle this problem' — whether it's the Archon X PRIZE to sequence 100 human genomes in 10 days for less than \$10,000 per genome, or the Progressive Automotive X PRIZE to design a car that achieves 100 miles per gallon or the Google Lunar X PRIZE to land a rover on the Moon. The contests motivate firms to invest hundreds of millions of dollars in private funds, adding a legitimacy and prestige that can spur on innovation.

Should scientists get out of the lab more?

Spending all your time in a lab reduces your health and intellect. By engaging in a variety of activities, you can stimulate your brain. Skydiving and scuba diving have opened up my world. And some things should be done just because they are fun and exciting. ■
Interview by **Jascha Hoffman**, a writer based in San Francisco, California.

See go.nature.com/Jp67ab for Nature Network's blog of the Imagine Science Film Festival.

Quantum Quest: A Cassini Space Odyssey
Imagine Science Film Festival,
CUNY Graduate Center, New York City
Preview on 21 October