

## Profile

## David Helfand's Guide to the Galaxy

## Seeking the Answers to Life, the Universe, and Everything

By Ginger Otis

David Helfand, chair of Columbia's Astronomy Department, knows some pretty frightening statistics about the fate of our constantly expanding universe, but he's not one to let that get him down. Despite spending his days plotting the course of dying stars, he comes across as a fairly normal guy.

"I didn't have a telescope when I was young," he points out. "As a matter of fact, I studied theater for awhile as an undergrad—physics was something I did between acting in plays and practicing squash."

It may have started out as a hobby, but somewhere in his undergraduate career at Amherst College, studying dark matter and exploding stars proved to be the more irresistible drama. After officially changing his major, he stayed on at the University of Massachusetts in Amherst to do his doctoral work, later moving to Columbia, where he's about to begin his 29th year.

Now, as co-director of the University's Astrophysics Laboratory, which last year brought in \$7 million in competitive federal research grants, he's working with his Astronomy Department colleague Arlin Crofts on the construction of an innovative new telescope in Chile's Andean mountains.

The immense instrument—developed with a scientist from British Columbia working in conjunction with the Astrophysics Laboratory—uses liquid metal as its reflector surface instead of highly polished glass.

"The glass alone in most telescopes costs \$25 million," notes Helfand, adding that the total cost for a conventional instrument of this size would be about \$80 million. "Our telescope—including computers, building materials and labor—will cost around \$5 million, which we have yet to find; but that's another issue."

The only drawback to liquid metal, he explains, is that the telescope can't be rotated or tilted. For his research, however, it's perfect—what Helfand wants is picture after picture of the same slice of sky.

"I study corpses of exploded stars

and naturally occurring radio beacons to map the geometry of the universe, which is expanding at an accelerated rate," he says. "By fixing on a large number of stars in the sky, we can see when they grow brighter and brighter, which means they're exploding, and then track how long they take to dim. Our knowledge of the accelerating expansion of the universe came from studying a few hundred of these stars; but to understand this bizarre result, we need to follow many more."

The telescope will track about 5,000 stellar explosions per year, following each for about two months after they burst into view. It will also help scientists to watch for asteroids on a collision course with Earth and enable them to measure the distances of a billion galaxies.

The liquid-metal telescope is just one of several projects underway in Columbia's Astrophysics Laboratory to address the twin mysteries of

dark matter and dark energy, which together make up about 95% of the universe, but whose identities scientists have yet to discover.

But even if they do solve the mysteries, there's no way to stop or even slow down the accelerated expansion of the universe, Helfand admits. "The sun will swell up and swallow the earth in about five billion years," he acknowledges. "Then the sun itself will die. It will be a dark, cold place."

He pauses briefly, and then adds, "But other stars will go on about their business, as will about a hundred billion other galaxies. We're really not the center of the universe, you know."



## For The Record

David Helfand's natural element may be outer space, but *The Record* asked him to imagine himself stranded on a desert island. What books and music would he like to have with him? Whom would he like to have as a conversational companion? What would he miss most, least? Here's what we learned:

**BOOKS:** *The Robot's Rebellion* by Keith Stanovich—the most important book I have read in at least twenty years—for its incisive dissection of perhaps the central problem of our age: the mismatch between the primitive cognitive processes on which most people rely, and the modern technological world in which they live. If I get a second choice, it would be Dickens' *Pickwick Papers* because no matter how many times I read it, it makes me laugh (probably as a consequence of my over-identification with the protagonist).

**MUSIC:** Janis Joplin's greatest hits because freedom is just another word for nothing left to lose, and von Karajan's recordings of Beethoven's symphonies.

**PEOPLE:** Richard Dawkins—I imagine we would have great fun railing against superstition and irrationality in the world outside our island. If I get to bring someone back to life, I might choose Samuel Johnson. I'm a teacher, and I can't think of a more fascinating student to spend a lifetime with, bringing him up to date on developments of the last 250 years.

**MISS LEAST:** The pervasive, all-powerful, soul- and society-destroying American mass media.

**MISS MOST:** Perigord truffles, fresh gnocchi, Peconic Bay scallops, and the many other wonderful ingredients I use in my cooking. (This choice is given context by the observation that all of the astronomers who have eaten my food agree I am a better cook than an astronomer—a dubious compliment at best!)

## Jagdish Bhagwati's 70th Birthday

On August 5, 2005, diplomats, scholars, business leaders, and members of the press gathered at Low Library for a gala dinner honoring renowned economics professor Jagdish Bhagwati on the occasion of his 70th birthday. Many of the guests, such as *New York Times* columnist Paul Krugman, had been Bhagwati's students, and one had been his instructor at MIT: the Nobel laureate, Robert Solow.

The Indian-born scholar, who holds the prestigious University Chair in Economics and Law, was widely praised as the rare academic who has not only influenced his field but also made a bridge into policymaking. Participants said that his free-market prescriptions have helped to liberalize significantly the global trade regime and have contributed to accelerated growth in developing countries, such as his native India. UN Secretary-General Kofi Annan (pictured, right) called Bhagwati an "inspiring" person and thanked him for "saying things people do not want to hear."

A week earlier, a two-day economics conference was held in Bhagwati's honor, at which many of his colleagues delivered papers. The conference organizers plan to produce a festschrift, or collection of essays, honoring Bhagwati for his contributions to the field of economics.

**ON THE WEB** | [www.columbia.edu/~ap2231/jbconference/jb\\_Participants.html](http://www.columbia.edu/~ap2231/jbconference/jb_Participants.html)  
Conference details, including links to papers



## In Print &amp; On Air

## International Affairs

**Gerald Curtis, Burgess Professor of Political Science, on Japanese Prime Minister Junichiro Koizumi's staking his premiership on postal system reform:** "He believes in what he is doing and he believes in changing the LDP. He wants to destroy the old machine." (*Reuters*, 5 August 2005)

**Jean-François Seznec, adjunct professor of international affairs, on the recent thaw in American-Saudi relations:** "The Saudis are in a great position today. [America] cannot be enemies with everybody. We need their oil desperately." (*New York Times*, 6 August 2005)

**Jagdish Bhagwati, University Chair in Economics and Law, on Tom Friedman's thesis about the "flattening of the world":** "The notion of a flat world is as wrong metaphorically now as it was when Copernicus showed it to be literally wrong. To be more precise than his metaphor, Mr. Friedman has on his mind not the world but a large fraction of it—India and China. He believes that the gradient which the citizens of these countries had to climb to get to our shores and out-compete us has now disappeared, giving way to a level playing field that we ignore at our peril." (*Wall Street Journal* op-ed, 4 August 2005)

## American Politics

**Victor Navasky, Delacore Professor of Magazine Journalism, on why America needs dissent:** "The great thing about this country is that our founding document has built into it a Bill of Rights, which guarantees the right to dissent. That's our safety valve—what keeps us going, what keeps giving us energy." (*Charlie Rose Show*, 15 August 2005)

## Art

**James Beck, professor of the history of art, on the newly discovered marble relief possibly attributable to Michelangelo:** "The vast majority of works which have been put forward as 'new' Michelangelos, we have to rule out. They just aren't technically or aesthetically competent enough to be by so great a genius. This is a work of exceptionally high quality. There's no question that it's good enough to be by Michelangelo." (*New York Sun*, 28 July 2005)

## New Media

**Steven S. Ross, associate professor of professional practice, Graduate School of Journalism, on the use of blogs by journalists:** "As blogs continue to gain in popularity, quality and influence, it is becoming imperative that journalists and journalism students continue to integrate blogs, especially blogs that cover technology, into their reporting practices. A number of credible and influential blogs such as Scobleizer, Gizmodo and Boing Boing, provide an invaluable trove of research, story ideas and other information that current and future journalists would be remiss not to leverage in their reporting." (*Media Relations Insider*, July 2005)

## Law

**Jane C. Ginsberg, professor of law, on the issue of copyrights for "orphan works":** "Many of those who raise concerns about orphan works start from the premise that there are works that should be in the public domain because their authors don't care about them, that they are clogging up the system and preventing subsequent authors from using them. That's not necessarily a correct premise." (*Chronicle of Higher Education*, 29 July 2005)