

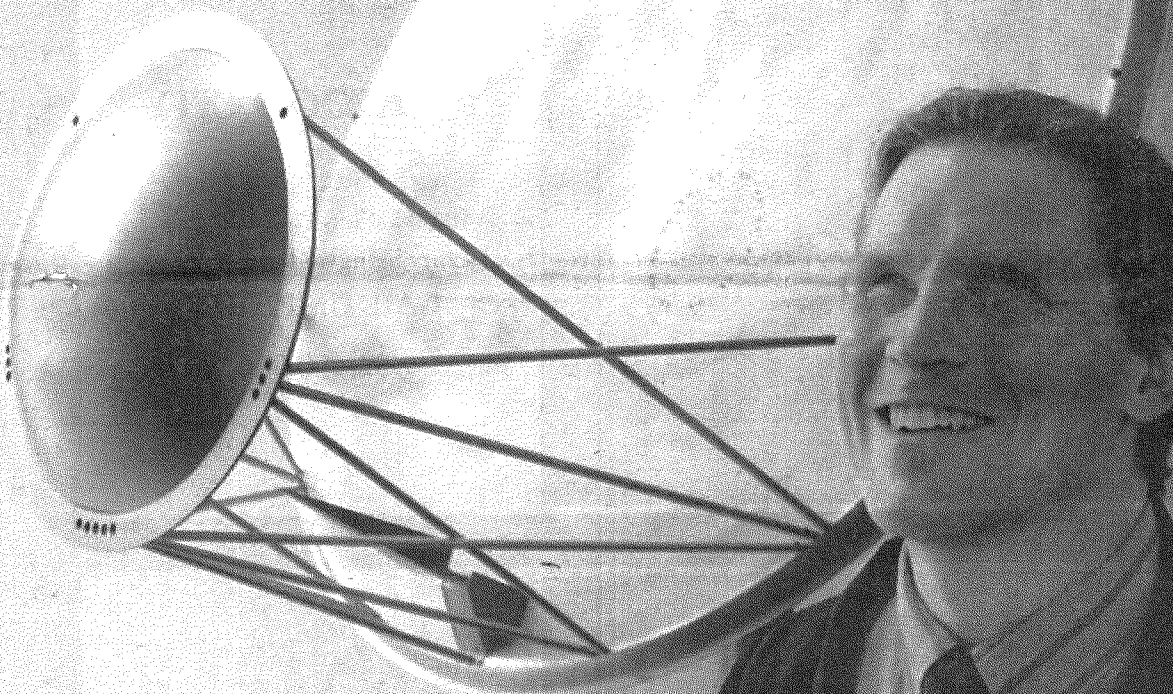
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Blind — and looking for ET



*Physicist Kent Cullers
helps organizations that
help the blind, while
searching the skies for
signals from intelligent
life in other worlds.
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Blind — and looking for ET

Menlo Park physicist Kent Cullers directs research and development for SETI, the institute that searches for intelligent life out there. He also supports organizations that support people with visual impairments.

I'm the first totally blind physicist and astronomer in the United States — and probably the world."

Starting with these words, Kent Cullers of Menlo Park recently mesmerized an Atherton audience, describing how he has addressed twin challenges in his life: growing up blind from infancy; and searching the skies to detect weak signals that may tell us we are not alone — that there is other intelligent life out there, somewhere.

**STORY BY
MARION SOFTKY**

Dr. Cullers was addressing sponsors of next week's Menlo Charity Horse Show, which benefits the Peninsula Center for the Blind and Visually Impaired. "This organization has changed the lives of blind people," said Dr. Cullers, who serves on the board and helps with everything from massaging its data base, to giving inspirational speeches to kids learning Braille.

Executive Director Pam Brandin noted, "Kent seems to have no barriers of his own. Plus, he's just good company."

Dr. Cullers has been blind almost since birth. He was born prematurely shortly after World War II, and put in an incubator with pure

oxygen. The oxygen saved his life, but destroyed his eyesight.

Now director of research and development at the SETI Institute (Search for Extraterrestrial Intelligence) in Mountain View, Dr. Cullers lives in Menlo Park with his second wife, Lisa Powers, a photographer he met in Puerto Rico when NASA was launching a new radio telescope. She was — and still is — making a documentary film about him.

He has two children by a previous marriage; Allen is in the Navy, and Melissa is a senior at Menlo-Atherton High School.

When Dr. Cullers talks about finding ET, he's not just dreaming. He's at the forefront of the worldwide effort to analyze signals from thousands of

millions of stars in hopes of detecting a message. "We're looking for complicated things that sound like intelligence," he says.

If scientists find ET, what will it be like? Not like us, Dr. Cullers replies,

but if you believe that the laws of physics apply elsewhere in the universe, "the probability that their technology will be like ours is high."

In a striking demonstration, Dr. Cullers pulls out a black box and plays a series of regular ticks, like a metronome.

"That click is a star that had a nuclear catastrophe," Dr. Cullers says dramatically.

This was the voice of a pulsar, a rotating neutron

star left over from a supernova, created when an ordinary star burned all of its fuel and exploded into a supernova. It was as bright as a billion

stars for a month or so, long ago, before the Egyptians built their pyramids. The ashes of the original star are still emitting weak signals as it rotates, "sort of like a lighthouse."

When people first discovered these signals, they called them "LGM" for "Little Green Men," Dr. Cullers says. They thought that such regular signals must indicate intelligence.

Later, Dr. Cullers plays a tape of slightly faster clicks. "We thought briefly these were an intelligent signal," he says, "until we found it was a radar signal from down the road."

Dr. Cullers, who developed mathematical formulas and computer programs that sort meaning from noise in signals, has even received recognition from Hollywood. He consulted for the technical scenes in the 1997 movie, "Contact," with Jodie Foster, and wrote some of the lines.

He was also a model for the blind astronomer, Kent Clark, and tried out for the part. "I was not a good enough actor to play myself," he says ruefully. "But I got a million Superman questions."

Dr. Cullers is optimistic that ET is out there and may be trying to reach us. There are so many stars, and technology is advancing so rapidly that the search is speeding up. "In my lifetime, we're going from



Photo by Lisa Powers, 2003.

ET buff Kent Cullers was caught by his wife, Lisa Powers, in Parkes, Australia, when he was collecting data on the radio-telescope there. She accompanies him on many of his working trips around the world. "I'm his seeing-eye dog," she says.



Photo by Nick Wright

searching thousands of stars to millions and billions of stars,” he says. “Computer power is growing so fast, the difference between searching a million and a billion is only about 15 years. New telescopes are more sensitive and can look in

‘There are probably as many galaxies in the universe as there are stars in our galaxy, and there are 400 billion stars in our galaxy.’

PHYSICIST KENT CULLERS

more directions in the sky at once.” Just in case, the SETI folks keep a bottle of champagne in the fridge.

Growing up blind

In many ways, growing up blind is easier than losing your sight after you have learned to depend on it, Dr. Cullers says.

“I felt normal. I never felt handicapped,” he reflects. “I could play soccer and dodge ball and baseball. I rode a bike. I still have my pogo stick in the garage.”

Other factors helped give Dr. Cullers a happy childhood. The vast influx of

premature blind and nearly blind babies some 50 years ago forced the education system to adapt, and to integrate blind students into regular classes, he says. Students were given tactile aids and special help in Braille. “I learned to type when I was 8.”

In addition, he was blessed with supportive family, friends and community. His father, a geophysicist, used to

Right: When the Allen Telescope Array (ATA) is complete after 2005, it will consist of 350 units like this model, arrayed over a distance of six miles, with signals integrated by computer. The first dishes of the ATA are already in place, **above, at Half Creek near Mt. Lassen. It is being built by the SETI Institute in Mountain View, and the University of California at Berkeley.**

read to Kent from the Golden Book of Astronomy, and magic tales such as King Arthur and the Knights of the Round Table. “I got better at science. I never got better at magic,” he recalls. “I always wanted to be a physicist.”

The budding scientist got his amateur radio license when he was 11, so he could talk with people all over the world. Inspired by his father, he began to dream about other worlds. “I imagined reaching out and touching an ice-cold planet,” he says.

By high school, the Cullers family moved to Temple City, California, where Kent was one of 15 blind students among 1,500. A straight-A student, he was a National Merit Scholar and class valedictorian.

By the time he got to graduate school at the University of California at Berkeley, Dr. Cullers encountered another problem — professors who often wrote more

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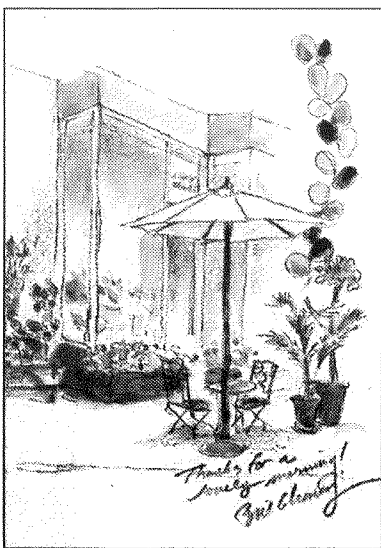
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Blind – and looking for ET

CULLERS

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than they talked. "All I heard was the scritch-scratch-scratch of chalk on the blackboard," he recalls.

These problems, too, he overcame with the help of Braille, recorders, and patient friends who would explain the lecture and draw the illustrations on his hand. "Computers made all the difference," he says.

Dr. Cullers' career has paralleled the growth of computers, and been helped by them. "When I graduated from college, I could read a book on a computer screen with vibrating pins under my fingers," he says.

Because of his own experience, Dr. Cullers devotes a lot of energy to helping the blind and organizations that support them.

"Blindness is very individual. Each blind person is different and has to define his or her own problems," Dr. Cullers says. The big limitation is on input-output. You have to ask for help."

With adequate help — from no-tech to low-tech to high-tech — blind people can become confident and competent. "It makes people feel valued and a part of society," Dr. Cullers says. "Once blind people learn to solve problems, they can operate as efficiently as anyone else."

His message to people who want to help but don't know how: "Give help when it's requested, and the kind of help that's requested. Let them tell you."

The search

"Maybe we are the only planet in the universe with intelligence."

Dr. Cullers clearly doesn't believe his own sarcasm as he reels off astronomical numbers that suggest that life somewhere else is inevitable. "There are probably as many galaxies in the universe as there are stars in our galaxy," he says. "And there are 400 billion stars in our galaxy."

SETI is massively screening radio signals from mid-range stars like our sun, which might be big enough to sustain life and last long enough for it to develop. "If 10 percent of all stars qualify, that adds up to literally billions of stars in our galaxy alone," Dr. Cullers says. "If half the stars have planets, it's probably true that there are a few other developed civilizations in our galaxy."

"Most other scientists believe there are intelligent civilizations out there."

By the time Dr. Cullers got his doctorate in 1980, SETI was getting started as a federal program under the National Air and Space Administration (NASA). Dr. Cullers knew this was his calling.

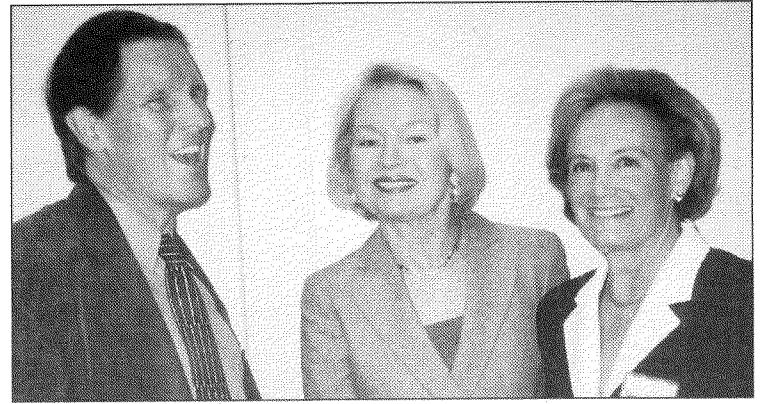


Photo by Marion Softky

Kent Cullers makes the rounds before the Sponsors' Lunch for the Menlo Charity Horse Show, which will be held next week at the Menlo Circus Club. With Dr. Cullers are Pam Brandin, left, executive director of the Peninsula Center for the Blind and Visually Impaired, which will benefit from the show; and Betsy Glikbarg of Atherton, chair of the Menlo horse show.

Ever since then, he has been immersed in the effort to extract pattern and meaning from cosmic noise flooding in from outer space. Working with NASA and the SETI Institute, he has developed mathematical algorithms for distinguishing between natural signals coming from the sky and intelligent signals. "I developed the computer programs and models for signal detection," he says. "We're looking for the whistles and clicks

'He has amazing abilities to visualize solutions. When he typed on his laptop, he looked like Stevie Wonder on a keyboard.'

**ASTROPHYSICIST
MARK GRIFFITH**

of distant technologies."

When the Kepler space probe blasts off in 2007 to look for Earth-size planets that might bear life, it will use an algorithm that Dr. Cullers helped develop. It will seek to identify planets passing in front of their stars. "This is the first way to directly observe planets the size of the Earth," Dr. Cullers says.

The same mathematics that detects meaning in radio signals from stars led Dr. Cullers to devise a technique for early detection of

breast cancer in mammograms. "The form of math is surprisingly similar," he says.

Dr. Cullers has received many awards, including NASA's Exceptional Engineering Achievement Medal in 1993, and Federal Employee of the Year in 1994. He is a member of the American Astronomical Society and also serves on the boards of the San Francisco Lighthouse for the Blind and Visually Impaired and the Sensory Access Foundation.

Computers and large arrays of telescopes are key to finding ET, Dr. Cullers explains. "The vastness of the search demands computers. Computers have patience and sensitivity that people don't have."

Mark Griffith, an astrophysicist who grew up in Atherton, remembers working several weeks with Dr. Cullers in Australia in 1995. "He has amazing abilities to visualize solutions," Dr. Griffith says. "When he typed on his laptop, he looked like Stevie Wonder on a keyboard."

Visualizing

The U.S. map on the wall of Dr. Cullers' office at SETI in Mountain View is blank white; the outlines of the states are embossed in tiny, raised dots.

Because of his blindness, Dr. Cullers interacts differently with the world than people with sight; he visualizes things differently. "I can imagine looking at the whole world at once," he says.

Dr. Cullers talks easily about what it's like to be blind, and how he perceives things that other people see. "I learned the difference between seeing the sun, and feeling its heat," he says. "I have no concept of color; I understand color in terms of wavelength."

These differences may have contributed to his physicist's intuition. "My ability to image in unusual ways has led me to quick, intuitive solutions to math-

■ INFORMATION

■ **For information on services for the blind**, contact the Peninsula Center for the Blind and Visually Impaired in Palo Alto at 858-0202; or log on at www.pcbvi.org.

■ **For information on the Search for Extraterrestrial Intelligence (SETI)**, call the SETI Institute in Mountain View at 961-6633, or check out SETI sites on the Web: www.seti.org; or setileague.org. Seti@Home offers ways to participate in SETI over the Internet; visit www.setiathome.ssl.berkeley.edu.

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