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### EXPLAINING THE UNIVERSES: SSU PROFESSOR LYNN COMINSKY'S LIFE WORK IS TO TRY TO UNDERSTAND THE MYSTERIES OF SPACE

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In a small office crammed with computers, **Lynn Cominsky** tries to figure out what's going on in the universe and how to explain it to the world.

Spend a couple of hours with her and your mind reels with descriptions of black holes, exploding stars and distant galaxies.

An MIT-trained astrophysicist who joined the Sonoma State University faculty 19 years ago, **Cominsky** is passionate about unveiling the mysteries of the universe -- and reluctant to make nonscientific guesses about them.

"Making predictions in this business is very difficult because most of the time the truth is stranger than fiction," she said.

**Cominsky**, 51, heads the department of physics and astronomy at Sonoma State and also advises the National Aeronautics and Space Administration.

She heads a NASA team whose mission is to explain the science of the universe to students, teachers and the public -- particularly in connection with a satellite named Swift that was launched in November and another, called GLAST, that is to be launched in 2007.

"Astronomy is the hook that we use to get kids excited about math and science," she said.

**Cominsky** revels in science. She is the deputy press officer for the American Astronomical Society, she's had a hand in developing software for satellites, and she's published more than 50 papers on X-ray and gamma-ray astronomy research.

At NASA's Goddard Space Flight Center in a Maryland suburb of Washington, D.C., **Cominsky's** colleagues describe her as an invaluable collaborator who has made a mark of her own in space research.

"The great thing about **Lynn** is she combines a strong science background and a

real excitement for science with her enthusiasm for translating that into popular language and making it available to the public, educators and students," said Neil Gehrels, the principal investigator for Swift, which seeks out explosions from beyond the solar system.

### Sci-fi roots

**Cominsky**, an avid science-fiction fan in her youth, said the portrayal of interstellar explosions has turned her away from modern sci-fi stories. "One of my pet peeves is explosions in space that make noise," she said.

As **Cominsky** explains, roughly once a day an immense explosion from the death of a giant star releases huge waves of gamma rays across the universe. Each explosion signals the birth of a black hole.

Swift detects the burst of gamma rays with a large telescope and turns to focus two small telescopes on the cooling embers of the explosion in visible, ultraviolet and X-ray light.

The location is immediately transmitted to Earth and goes out over the Internet.

Robotic telescopes -- like one built by **Cominsky's** Sonoma State crew at the Pepperwood Preserve north of Santa Rosa -- automatically turn to examine the visible light, helping scientists who hope to learn what triggers such explosions.

On Nov. 20, **Cominsky** watched the launch of the \$250 million satellite from Cape Canaveral, Fla. Before it was fueled, she got to clamber around the nine-story scaffold that held the rocket in place.

**Cominsky** is excited about the upcoming launch of GLAST, which will be used to try to learn how black holes shoot out jets of gamma rays and charged particles from beyond the "event horizon" -- the point when something irreversibly disappears as it is sucked toward an infinitely small and incredibly dense black hole.

"We're trying to learn about the jets, because black holes are supposed to be sucking in everything. How are they shooting out these jets?" she said. "Something is accelerating the particles so they are going almost as fast as the light. We don't know how that happens."

Despite her youthful interest in science fiction, **Cominsky** didn't come naturally to her career as a space scientist.

She entered Brandeis University as an aspiring psychologist, and her parents urged her to become a doctor. Her goals changed when she learned that vision research involved the dissection of cats' eyes, which conflicted with her philosophic values as a vegetarian. She turned her attention to chemistry and the emerging world of computers.

After graduation, she took a job with the Harvard-Smithsonian Center for Astrophysics, where she worked with a future Nobel Prize winner on the first NASA satellite to study X-rays coming from things like black holes, exploding stars and distant galaxies.

She earned a doctorate in physics from the Massachusetts Institute of Technology, where she met her husband, Garrett Jernigan. They moved to California and took jobs in 1981 at the Space Sciences Laboratory at UC Berkeley.

As the only female manager on a project with hundreds of employees, she supervised more than 70 engineers and scientific programmers working to build instruments to be

launched into space by NASA.

"It's the story of my life," she said, noting the male dominance of the world of physics.

"I will go to meetings, and it really will be me and 100 men in the room. It's always been very lonely being a woman in physics."

She came to Sonoma State in 1986, when the the explosion of the space shuttle Challenger delayed her Extreme Ultraviolet Explorer Satellite project. When she became chairwoman of the department last fall, she stopped teaching classes -- something she says she misses -- because she was spending so much time traveling for NASA.

Little H-Bar Ranch

While her scientific interest extends to outer space, her interests at home are down to earth. **Cominsky**, who has no children, lives on a 4-acre Petaluma ranch where she has four horses, a dog and six cats.

She and her husband named the spread "Little H-Bar Ranch." The brand, a small "h" with a line through it, represents Planck's constant, the smallest measurement that sets the scale of the quantum universe.

"Our scientist friends get the joke right away," she said. "Our horse friends wonder where we came up with the cool brand."

Despite her enthusiasm for space exploration, she's not fond of President Bush's vision of putting astronauts on Mars or back on the moon, saying that sucks money from more scientific causes.

"Right now we do not have the capability to get our astronauts to and from the space station without relying on the Russians," she said. "So I am not that optimistic about our chances of being able to get back to the moon or to Mars in the near future."

For now, she is concentrating on the Swift mission and her role in trying to explain it to the public. She played a key role in getting NASA's go-ahead for the project.

Gehrels, who also is chief of NASA's astroparticle physics laboratory, said he could bring only two other people when he presented Swift, one of five finalists selected from almost three dozen proposals. **Cominsky** was one of them.

"She had great ideas for how to do the mission and also how to translate that into public enthusiasm," Gehrels said. "I think it was a key part of our being chosen to fly." Steve Maran, who retired from Goddard in October as assistant director of space sciences and now serves as press officer of the American Astronomical Society, said **Cominsky** is a natural at knowing what captures the public's attention.

"In just over 20 years of doing press relations for the society, I have found that it is rare for a working scientist to have this talent, because what may be important to scientists is not necessarily interesting to the public and the press, and vice versa," Maran said. Ruben Arminana, the president of Sonoma State, said **Cominsky** is one of the best professors on campus at combining engaging teaching, cutting-edge research and public service, particularly with school teachers and students.

Her work with NASA has been important in tying the university to important research and to public schools, he said.

**Cominsky** was scheduled to be the featured Astronomy Day speaker on Saturday in Holton, Kan., where the astronomy program has one of the robotic telescopes that track Swift's discoveries. One of her program's two dozen "ambassadors" teaches at the 306-student high school.

Speaking before her trip, she said she planned to tell some of her favorite stories about the universe, and about what Holton residents can expect to see through their

telescope.

``I'm going to tell them all about monstrous black holes, exploding stars and blazing galaxies," she said. ``They will be able to see things no one has seen before."

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PHOTO: 2 by CHRISTOPHER CHUNG / The Press Democrat

1 computer image by Aurore Simonnet/NASA

1: The Swift satellite, launched into orbit in November, seeks gamma rays that result from the explosions of distant stars.

2: Sonoma State University professor **Lynn Cominsky** is an MIT-trained astrophysicist and a NASA adviser. She is program director for a NASA program that aims to explain the science of the universe to students, particularly in connection with the gamma-ray detecting Swift satellite, launched last year.

3: At her Petaluma ranch, **Lynn Cominsky** prepares to ride her horse, which she named Blazar for a galaxy that emits gamma rays.

#### **Infobox:**

SPACE SCIENTIST

**Who: Lynn Cominsky**

**What:** Chairwoman of the department of physics and astronomy, Sonoma State University; NASA adviser, heads NASA team whose mission is to explain science of the universe to students

**Born:** Nov. 19, 1953

**Married:** Garrett Jernigan

**Education:** Massachusetts Institute of Technology, Ph. D. in Physics awarded Dept. 1981; Brandeis University, B.A. in Physics awarded Jan. 1975, with honors in chemistry

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