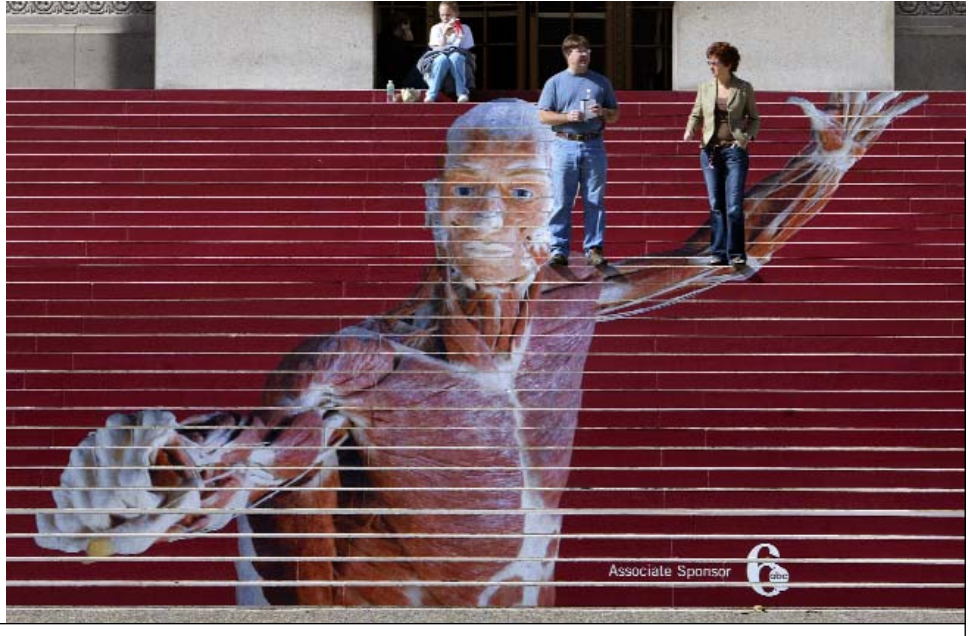
Walk through a human heart, mummify a frog or experience space travel at Philadelphia's Franklin Institute.



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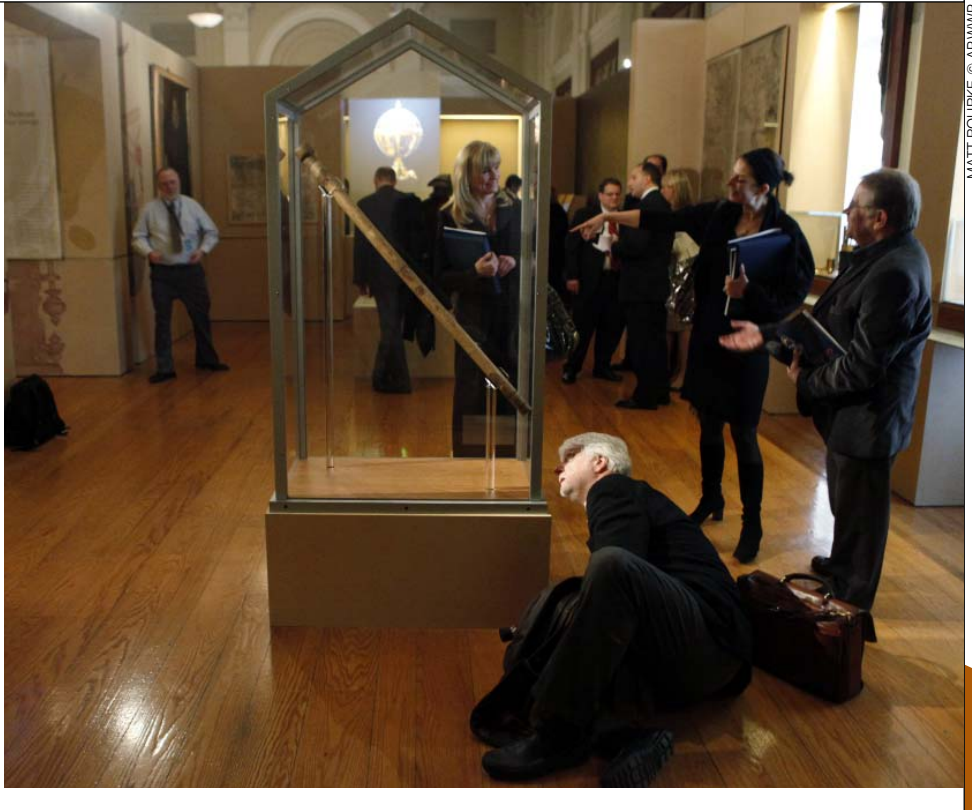
Practical Science

By VIBHUTI PATEL



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When the Museum of the History of Science in Florence, famous for housing Galileo Galilei's 400-year-old research telescope, announced its plans to close for renovation, museums all over the world rushed to offer the telescope a temporary home so it could be shown outside Italy for the first time. A bidding war ensued as hundreds of requests poured in for the rare opportunity to showcase a historic instrument, widely regarded as the ancestor of the Hubble, created by a man Albert Einstein called the father of modern science.

Philadelphia's Franklin Institute won the honor to host the telescope, other instruments of Galileo, paintings, prints and manuscripts from the 17th century collection of Florence's Medici rulers. This spring, it kicked off the "100 Hours of Astronomy" program as part of the International Year of Astronomy with the worldwide participation of nearly 80 observatories and thousands of observers.

The Franklin displays the collection in a special exhibit, "Galileo, the Medici and the Age of Astronomy," through September 7. "Creating awareness of these artifacts makes sense for us because Galileo's story of seminal advance in science is similar to the story we tell of science in early America through Benjamin Franklin," says Derrick Pitts, the Franklin's chief astronomer. "Our mission reflects values that encourage people to pursue science today." As the Franklin's planetarium and astronomy program focus on the exhibit, its observatory provides modern telescopes for visitors to observe stars, planets, and maybe even a

Top: Visitors stand over a sectioned image promoting the "Body Worlds" exhibit on the steps of the Franklin Institute in Philadelphia.
Above: Galileo Galilei's telescope at a press review for the exhibition "Galileo, the Medici and the Age of Astronomy" at the institute.

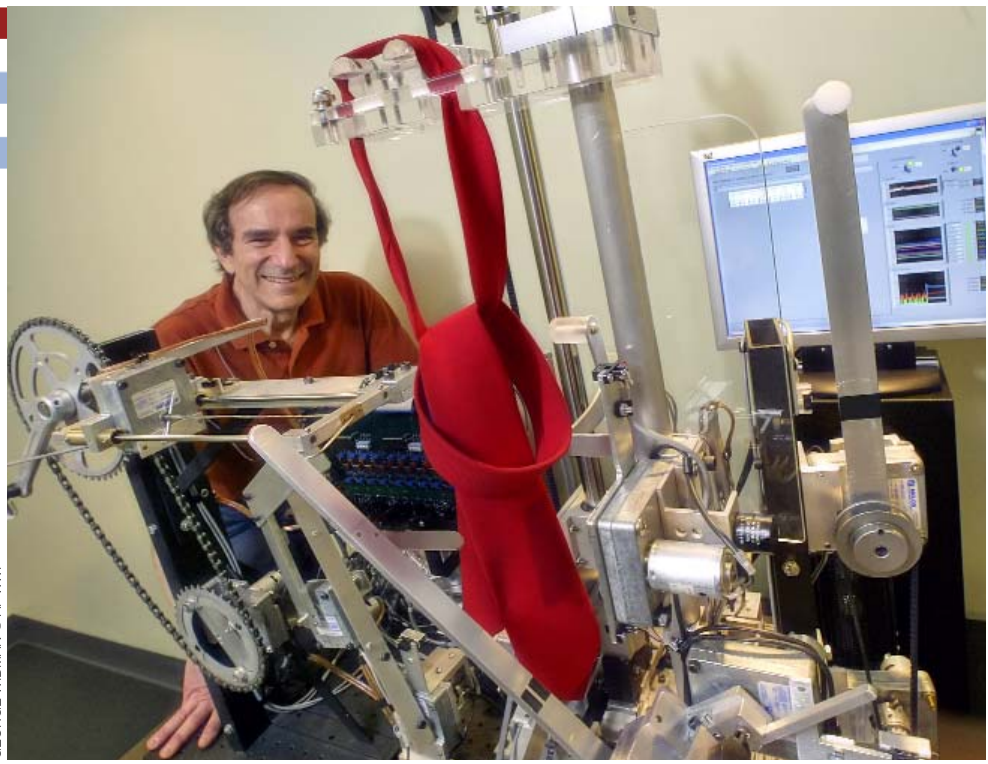
For more information:

The Franklin Institute
http://www2.fi.edu/index.php
International Year of Astronomy 2009
http://www.astronomy2009.org/

galaxy or two. Pitts claims, "We offer a personal discovery as valid as Galileo's first look through his telescope."

The Franklin Institute was founded in 1824, in memory of Benjamin Franklin, a minimally schooled printer who got rich and retired early to become a respected statesman. He went on to become one of America's Founding Fathers, an ambassador, a writer and a scientist. This iconic Philadelphian's legacy was so highly regarded that, after his death, the city honored him as a role model by founding the Franklin Institute. It started as a meeting place for mechanical engineers, a library of scientific books and journals and a place where patent models and records of patents (of machines like the first 35-mm film projector) were stored.

Very soon, it became a center where students came to learn mechanical design and drawing, where inventions were tested, where scientists helped entrepreneurs develop and build their inventions. In short, it proffered practical applications of technology. In 1824, the Franklin instituted awards for the best products and inventions. Called The Franklin Institute Awards they became America's "Nobels." When the first U.S. government grant for technology research was awarded to the Franklin—to investigate explosions in high-pressure steam boilers on ships and trains—the institute's engineers revolutionized the use of such boilers.



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Above: Retired engineer Seth Goldstein from Maryland with his computer-driven necktie-tying machine, Why Knot, at the Franklin Institute. It was part of an exhibit titled "Sir Isaac's Loft: Where Art and Physics Collide."

Below: A 16th century polyhedral dial (left) and an armillary sphere (right), which are part of the exhibition "Galileo, the Medici and the Age of Astronomy."

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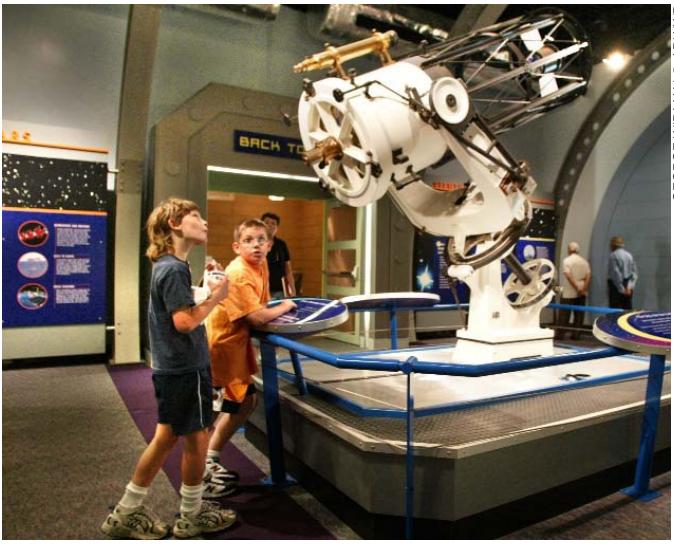
In 1934, the institute expanded, moved to a new building in a prime location, and established a museum, a temple of science in honor of Franklin and his entrepreneurial and scientific spirit. Its mission is to teach science in a hands-on way so visitors of all ages can participate by handling the devices themselves, rather than looking at scientific artifacts from a distance. "We encourage people to pursue their interest in scientific knowledge," says Pitts. "We give everyone an opportunity to satisfy their curiosity." The museum includes an aviation wing and a train wing, but its greatest legacy is in astronomy because its planetarium—the second oldest in the United States—is complemented by a fully equipped observatory, not for research but for public use.

However, the Franklin is much more than its museum which, though impressive, is only a small part of its outreach. Reinventing itself constantly, through the 1970s it was an important research institute with facilities on every continent, including an astronomical observing station at the South Pole. For years, the Franklin collab-

orated with institutions around the world, fulfilling a need for manufacturers and universities that did not have research facilities. Later, as universities took on that essential role and the need disappeared, the Franklin shut down that program. Now, with a million visitors a year, it is a premier science museum known for its sophisticated permanent exhibits.



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Left: Dylan Lutton and C.J. Hoag look at a telescope and space exhibit at the Franklin Institute. Below: The two-story walk-through heart at the institute is big enough for a 67-meter-tall person.

Among the oldest of these is a giant model of a heart, large enough to belong to a 67-meter-tall person. Visitors can walk through it and, like corpuscles, see it from inside, hear the sounds of blood coursing through, climb up and down stairs to see its different chambers, the aorta, and pulmonary veins connecting to the lungs. It includes related exhibits on cardiac health, nutrition, the amount of blood circulating in our bodies, even other mammals' hearts.

Then there is the "Train Factory" with its 350-ton Baldwin steam locomotive, an experimental model testament to man's ability to build machines. It weighs more than a fully loaded aircraft, yet can travel at 100 mph. Here, visitors can ride it back and forth and examine its insides. "Amazing Machine" shows the interiors of everyday objects like the power drill, thermostat and the household vacuum cleaner and demonstrates how they work. Other permanent exhibits include an air show focusing on aviation, with the Wright brothers' aircraft and explanations about the science and technology of flight; a "Sports Challenge" exhibit; "Space Command"; and, "Sir Isaac's Loft" where Newton's principles and the laws of physics can be studied—hands-on, naturally!

The Franklin's rotating special exhibits are its trademark. In 2007, "Tutankhamun and the Golden Age of the Pharaohs" focused on King Tut's tomb by explaining the 3,000-year-old technology used to build the pyramids and mummify bodies as school children mummified worms and frogs, and studied Egyptian astronomy, Pitts says. In the "Titanic" exhibit, the shipwreck was examined via reproductions of the ship's sections and studies of icebergs. Questions addressed included: How do ships stay afloat? Why did the "Titanic" sink? What happens at very cold temperatures?

The Franklin's crown jewels are its observatory and planetarium. Using special filters for eye protection, visitors look through its telescope at the sun. The moon, visible planets, bright stars, even a galaxy and a few nebulae can be seen during the "Night Skies" program on the second Thursday of every month. Even when none of these are visible, just to look through a telescope is an educational experience for the thousands who have never done so. "Our mission is to support people's curiosity; our telescopes work fabulously for this purpose," says Pitts.

The observatory is supported with lectures and an enhanced 3-D-like experience at the regularly upgraded planetarium. Pitts says it has the "capability to offer an experience of flying out into space: you fly way out into star-field, go out of our galaxy into others, look around there, look back to where we've come from, see what the universe looks like, then fly back to our galaxy, into our solar system, passing the planets as we return to Earth. It's a very moving experience—and an opportunity for us to teach modern astronomy." A mission befitting Galileo himself.

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