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400 Years of Galileo: Myths, Facts and Influence of a Renaissance Man

BLOOMINGTON, Ill. – Galileo Galilei has been called the father of modern astronomy, the father of modern physics and the father of modern science. As the international science community prepare celebrates the 400 th anniversary of Galileo turning his telescope to the skies, Illinois Wesleyan University Professor of Physics Linda French talked about the continuing influence of this Renaissance man.

“Anyone who has ever taken physics, or even looked through a telescope, has some knowledge of Galileo’s findings,” said French, of the man who discovered four moons of Jupiter, and promoted the idea that the earth was not the center of the universe. It was the latter idea that ran Galileo into trouble with the Inquisition. “I think more people remember him for his problems with the Inquisition than his mathematical interpretation of physical properties,” she said. “Whether he wanted to or not, he fought a battle that had to be fought.”

That battle began over Galileo’s research conducted in 1609, which he published the following year in a pamphlet called *The Starry Messenger*. By the time of its publication, a number of those studying the stars acknowledged that the earth was not the center of the universe, which had been proposed by the ancient philosopher Aristotle. “Aristotle’s physics were terrible,” said French, with a laugh. “And anyone who took the trouble to examine it realized this.”

Nearly a century before Galileo, mathematician Nicolaus Copernicus had published a “heliocentric” view of the galaxy – claiming the planets revolved around the sun. The trouble was, said French, his teachings had been incorporated into the theology of the Catholic Church through men like St. Thomas Aquinas. So to question them was to question humanity’s place as the center of God’s universe, and was tantamount to heresy. “A battle had to be fought to separate Aristotle’s theology and Aristotle’s physics,” she said.

When Copernicus published his works, he wrote in Latin, so only a few scholars could read it. He also phrased it as a theory, not a direct challenge. “Galileo seems to have had a talent for alienating people. He was smart and he wasn’t going to be shy about it,” said French. “He did not write it in Latin, which was the language of the scholars, but in Italian. Nor did he phrase his findings as theory.” Instead, he questioned Aristotle’s findings on gravity and its effects on heavenly bodies, using practical experiments that are still employed today. “Every physics students has had to roll objects down a plane and time them to see the effects of gravity,” said French. “Galileo was out in the field, disproving Aristotle’s physics.” He also turned his theories of gravity to the skies using the brand new tool of a telescope. “People warned him, ‘Hey, Galileo, you might not want to do this,’ but I think he believed it was so obvious he was right that he thought he could convince people,” she said. “He had a way of throwing down the gauntlet.”

The gauntlet was thrown once again in 1632 with the publication of Galileo’s *Dialogue Concerning the Two Chief World Systems*, in which two characters discuss whether the galaxy is based upon the geocentric (earth-centered) views of Aristotle, or the heliocentric (sun-centered) views of Copernicus. “This time he published it as if the arguments are a dialogue between two characters where the wise Copernicus scholar defeats the foolish Aristotle supporter with his wisdom,” said French, “but the dialogue is supposedly taken directly from conversations with his friend, Bishop Maffeo Barberini, who became Pope Urban VIII. You can’t tweak the nose of the pope and expect leniency.”

Near the end of his life, under the threat of torture, Galileo did recant his findings to the Inquisition, an ending that is ironic now as the Catholic Church supports scientific exploration. Yet Galileo’s battle opened up the doors to modern science. “When following Aristotle unquestioningly, there was no connection with reality, no experimentation. As long as that mind-set held, there could be no modern science,” said French. “This really bothered Galileo. He also developed the mathematical interpretation of physical properties that we use today. In many ways, he was the first real modern scientist.”

Myth or Reality?

- Galileo invented the telescope. **Myth:** Though he was one of the first people to publish findings based upon research done with his telescope, Galileo did not invent it. Credit has gone to Hans Lipperhey, a Dutch eyeglass maker.

- Galileo discovered sunspots. **Reality:** Galileo was the first to see sunspots through his telescope and record them. In fact, looking for them they may have contributed to his loss of sight in his later years.
- Galileo gave the large, dark area on the moon the name of “maria.” **Reality:** When he looked at these areas through his telescope, he saw that they were smooth and thought they were large seas. He thus gave them the Latin name for sea – maria. Today, we know they are old lava flows.
- Galileo was a court scientist. **Myth:** People didn’t become scientists back then, so he became a mathematics professor. He did, however, try to solicit financial support from the wealthy Medici family by calling his Jovian satellites he discovered the “Medicean stars.”
- Galileo’s father wanted him to become a doctor. **Reality:** Galileo came from impoverished gentry. His father, who is credited as being one of the founders of modern opera, wanted his son to have a steady income.
- The Galilean Satellites of Jupiter are named for Galileo. **Reality:** Galileo was the first to see the four moons of Jupiter through his telescope and record them. The satellites are named in his honor.
- Right after he recanted his findings to the Inquisition, Galileo repudiated it with the words “but still it moves.” **Myth** – According to French, “Galileo recanted his findings to save himself from torture and death, but supposedly murmured under his breath muttered ‘but still it moves,’ meaning the earth is not the center. Ah no, only a fool would say that to the Inquisition.”

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